PRINTING THEORY AND PRACTICE

I

Compositors' Equipment

PICKERING

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"42-line" and "36-line," because of the number of lines to the columns of the pages) it has been assumed that Gutenberg first set up his workshop in the year 1440 or thereabouts, and that his helpers were Johann Fust, a goldsmith who helped him financially, and Peter Schoeffer, who later became Fust's son-in-law. It was Fust and Schoeffer who succeeded to Gutenberg's plant and equipment as a result of a law suit, and they printed the first book to bear a printed date (1457), the beautiful Mainz Psalter with its close-register, two-colour initials. It is possible that Fust and Schoeffer completed the "42-line" Bible (originally begun by Gutenberg), and that Gutenberg started to print again (possibly at Bamberg) and produced the larger "36-line" Bible after having obtained fresh financial support.

The art soon spread to other towns and countries after its perfection and introduction at Mainz and centres were established at Cologne, Augsberg, Basle, Rome (Subiaco), Venice, Bruges, Antwerp, Paris, and, later, London, when, in 1476, William Caxton brought his press to the precincts of Westminster Abbey, where he had received permission to establish a printing office.

A rival claim for the "invention" has been made on behalf of one Laurens Coster, of Haarlem in Holland, but whatever work was done, it had no practical value. It is generally agreed, therefore, that the credit of establishing printing from movable types as a practical commercial venture is due to Gutenberg, with the help of Fust and Schoeffer.

Typography, or Letterpress Printing, is, however, only one method of printing; reference should also be made to the other methods.

The earliest method of printing is in *relief*—that is, the parts not required to print are below the printing surface.

There are two other methods of printing, each having several differing processes using the same principle. In historical order they are: the *intaglio* (or sunken image processes) method which originated in the early years of the fifteenth century; and, much later, the *planographic* (or

surface) printing method resulting from the invention of the lithographic process in 1798.

In the intaglio group are many of the fine art processes of printing, such as engraving (on copper or steel plates), etching, mezzotint, aquatint, dry-point, and the comparatively recent process of photogravure which is now being increasingly used as a commercial process, especially for rotary printing.

The invention of lithography by Aloys Senefelder at the end of the eighteenth century made possible an entirely new principle of printing in which the printing surface is neither raised nor sunken. This principle is used to-day in both direct and offset lithography as well as in the purely facsimile photographic process of collotype.

For details relating to these processes the student is referred to other volumes in this series.

The practice of typography, if it is to be performed satisfactorily, needs careful workmanship at all times, and it should be the aim of every student to learn all he may about type and typographic materials from both the practical and æsthetic points of view. Excellence in practical work will not of itself make an educated craftsman. To the sound and efficient practice of composing it is necessary for the compositor to add a knowledgeable background of English, punctuation, style, orthography, etc., as well as a disciplined training in typographic design. Attention must therefore be given not only to technical matters appertaining to materials, equipment, and their use, but also to those relating to type and typographic design and layout.

Knowledge of related processes of printing, their possibilities and use in association with type, are of the utmost importance to-day, when so much printed work is produced by means other than typographic. The would-be typographer or layout man has to associate type with these processes, as well as know their technical limitations. He will, too, require the technical background of type, mechanical composition, and practical composing if he is to direct successfully the

work of the composing room by means of the layout. The chapters which follow should, then, be read with intelligent interest if the maximum benefit is to be derived by each student according to his need.

It is perhaps fitting to end this chapter with a quotation from that eminent typographer, Mr. Stanley Morison, who in his *First Principles of Typography* defines typography "as the craft of rightly disposing printing material in accordance with specific purpose; of so arranging the letters, distributing the space and controlling the type as to aid to the maximum the reader's comprehension of the text. Typography is the efficient means to an essentially utilitarian and only accidentally æsthetic end, for enjoyment of patterns is rarely the reader's chief aim. Therefore, any disposition of printing material which, whatever the intention, has the effect of coming between author and reader is wrong".

HAPTER 2

PHYSICAL FORM AND LIMITATIONS OF TYPE

TYPE, by reason of its physical form, is a medium imposing limitations which have to be respected if satisfactory and successful results are to be obtained from its use.

As type is a relief letter-form standing upon a rectangular body, capable of assembly, letter by letter, to form lines, and ultimately pages, it is not possible to resort often to other than regular and straightforward settings. The few occasions when lines in a given setting may be set advantageously at an angle, running up or down the page, are, indeed, rare. Of more importance to the compositor is the consideration of the extra time involved in arranging and justifying the contents of his page.

"Stunt" arrangements are troublesome because infinite care is necessary if the completed setting is to be lifted with safety from the imposing surface. Generally, the result achieved does not warrant the time taken, and for this reason the student is warned that he should respect the limitations which typography imposes from the outset—for only in that way will real progress be possible.

Before considering the production of type in the type foundry, or the contemporary method of obtaining identical matrices for use on mechanical composing machines, the type character will be described, particularly those features which are of practical importance to the compositor.

THE TYPE CHARACTER. The face of a type stands in high relief upon a rectangular metal body and is obtained by casting in a mould from a matrix bearing the letter design as an intaglio (sunken) image at one end. In order that types may be inked uniformly by the rollers of the printing press, and the pressure evenly imparted, each character must be

of a predetermined and accurate height. This dimension is termed "height-to-paper" or "type-height," and in England where the British-American Point System is now universally used, the standard is 0·918 inch. There are, however, varying heights-to-paper in certain European countries. Fortunately for English printers, types cast on the Continent, because they are cast to Didot standard point system, are generally higher than the English standard and may be planed at the foot when not specially cast to English height.

All other dimensions of the type body are carefully and accurately ensured. The dimension from front to back is referred to as the *body size,* and this is, to-day, cast to a definite number of points (*see* Point System, p. 25). The body sizes cast by the type-founder are normally in a progressive range of sizes—odd sizes are not cast except for special reasons. The normal body sizes of types are: 5, 6, 7, 8, 9, 10, 11, 12, 14, 18, 24, 30, 36, 42, 48, 60 and 72 point; occasional special sizes are 16 point and 22 point (*see* illustration, p. 28). The *width* of a character is generally determined by the character itself, e.g. a capital W is wider than a lower-case d. The width is arranged to give only the amount of space on each side of the character necessary to allow the letters to combine pleasingly with each other to form words. The width of the character is referred to as the "set" of the type —meaning the adjustment of the spacing on each side of the face which governs the width (*see* also Point Set, p. 27).

The various physical features of a type character will be seen in Fig. 1.

The *shank* is the type-founder's name for the body or bulk of the type. The *face* is cast at the top of the body and stands in relief from the *shoulder.* The internal spaces of a letter, such as the eye of an e, are called the *counters.* The slightly oblique and sloping wall from the face to the shoulder is termed the *bevel;* this should not be confused with the space (called the *beard* of the type) from the base of a capital or non-descending lower-case letter to the edge of the body. The beard is the space below the alignment line which is

necessary to accommodate the descending strokes of such letters as g, j, p, q, y on the type body. The beard varies according to the letter design of the fount and may be large or small according to the length of the descending letters. The *front* of the type is the underside of the character which

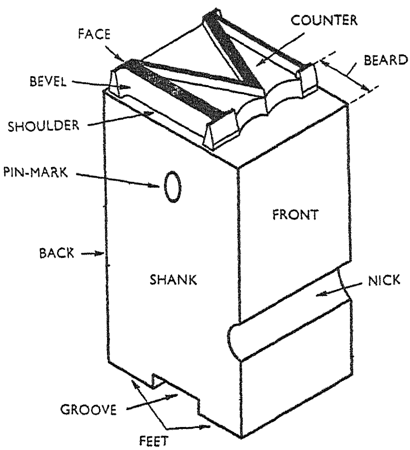


FIG. 1. THE PARTS OF A TYPE CHARACTER.

takes the *nick*. The nick or nicks are used (*a*) to distinguish between founts (each fount from the founder usually having a different combination or a different position of grooves), and (*b*) to help the compositor, when setting type, to know which way to pick up the type when placing it in his stick; and (*c*) to distinguish small capitals o, s, v, w, x, z, which have an additional nick on the back of the type. (Note: Monotype cast characters have only one nick, identical in all founts.) The *back* of the type is the opposite side to the front. The *pin-mark* is on one of the *sides* of the type, and is used either to indicate the foundry mark or the point body size.

The *groove* appears between the *feet* of the type character and its purpose is to remove the burr caused by the break of

the "tang," and to ensure that any small piece of dirt or grit may not remain under the feet and thus cause a letter to stand high in the forme. In larger sizes, the groove is not formed (as in smaller types) by planing after removing the "tang" after casting, but is cast as a large hollow to avoid the

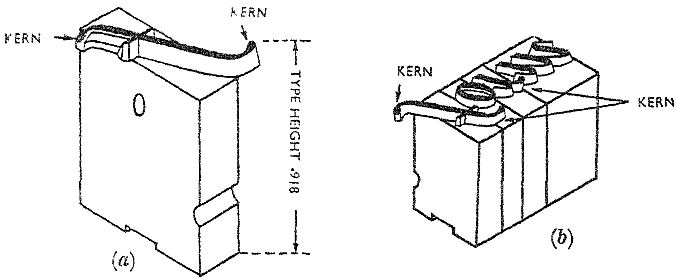


FIG. 2. (*a*) A KERNED LETTER; AND (*b*) AN ASSEMBLED WORD, SHOWING OVERLAPPING OF KERNS.

use of undue metal and to save weight. (Sometimes, in larger types, if the groove is not specially cast, large holes are bored in the sides of the body to save weight.) In certain casting machines the groove is automatically cut and there is no breaking of a "tang." (*See* also Chapter 3.)

In most founts of type, special characters (fl, ff, fi, ffl, ffi), cast as one type and termed "ligatures", are necessary because the lobe at the top of the lower-case f overhangs the adjacent letter. When this overhang is free (as in f, *f*, *ff*, and so on) it is called a *kern*. Similarly, in certain italic and script founts it is necessary for the founder to manufacture letters that overhang the next letter in a freely designed fount. Kerned letters have, normally, to be hand-finished and filed so that they overhang adjacent characters. The compositor should be extremely careful, when planing a forme containing italic or script types, to avoid breaking or battering the delicate overhanging portions of the letters. (*See* Fig. 2.)

Certain combinations of letters are made as special ligatures (termed "logotypes") to obviate this, e.g. *ct*, *st*, *gg*, *gy*, etc. This facility has been fully exploited on Linotype machines in certain founts to enable fully kerned italics to be mechanically composed and cast in text matter (*fa*, *fe*, *fo*, *fu*, etc.). As type is cast individually on Monotype machines, free kerning, wherever desirable, is as possible as in the case of founders' types. Because no kerning is possible in mechanically set line composition (Linotype, Intertype, and Typograph), the use of logotype matrices is essential if the freedom of an italic fount is to be kept. Fig. 3 shows how the letter design must be adapted to avoid the necessity of kerns, and also why the normal slug-cast italics must be wider in "set" than in separately cast types.

The Ludlow system (*see Mechanical Typesetting*) is able to obviate the wide "set" of italics by the ingenious use of sloping matrices composed in a special composing stick, thus allowing free kerning in the cast slug (*see* also Fig. 8).

(*a*) (*b*)

FIG. 3. ADAPTATION OF LETTER DESIGN TO PREVENT KERNS.

(*a*) Lower case f; (*b*) Slug-cast italics (excepting Ludlow).

When composing type into lines in the stick, the individual characters are assembled side by side, using a space after each word. The spaces and quads used by the compositor are of several thicknesses (all being fractions or multiples of the em quad); these are less than type-height and are normally slightly lower than the shoulder of the type, as seen in Fig. 4.

It is important to note that the relationship of spaces and quads to the em quad is of great practical value to the compositor, both when setting type and making-up. (*See Compositors' Work:* Spacing and Justification.)

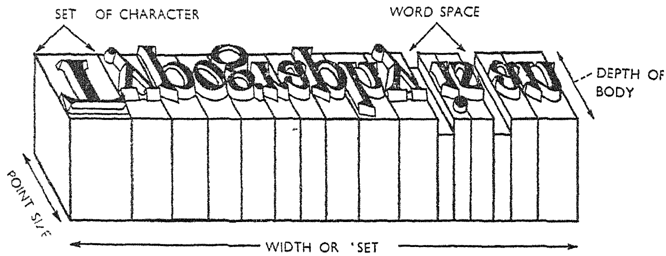


FIG. 4.

ASSEMBLED TYPE LETTERS, SHOWING INSERTED WORD SPACES.

CHAPTER 3

TYPE-FOUNDING

The art of the type-founder underwent little change from the time of Gutenberg and the early printers, who cast their own types, until the latter part of the nineteenth century. The first independent type-founder was Claude Garamond, a Frenchman, whose founts were used all over Europe by the noteworthy printers of his day during the latter half of the sixteenth century. The predecessors of Garamond were both founders and printers, and the divorce of type-founding from printing arose from trade disputes in Garamond's time.

Punches are still cut by hand (though rarely) and the matrices struck in a similar manner to those of olden times; it is a declining art and there are few skilled punch-cutters to-day. This gradual change was brought about by an entirely different method of producing punches by machines, a method invented in America by Linn Boyd Benton towards the end of the nineteenth century and later adapted by others, including F. H. Pierpont of the then Lanston Monotype Company (now the Monotype Corporation). These methods, originally intended for the production of multiple matrices for the use of mechanical composing machines, have, of course, similarly amended the making of punches and matrices in the production of founts by the normal type-foundry. There are, however, still founts produced from newly-made hand-cut punches, as well as from the old and original hand-cut punches of some of our most famous and historic types.

The special technique of contemporary matrix production will be dealt with in the succeeding chapter. In this chapter, the original hand method of punch-cutting will be described, together with the casting of type in the type-foundry.

PUNCH-CUTTING AND MATRIX-MAKING. The first consideration in the production of a fount of type is, of course, the letter designs. If the fount is to be entirely new, original drawings of each letter and character of the fount are made by the designer. The exact size of these drawings may vary, but generally they will be made of convenient size for a careful finish to be obtained (say $1\frac{1}{2}$ to 2 inches height of capital). From these originals the working drawings are made, generally larger in size, when photography may be employed, in order that every inflexion in the original may be more clearly seen by the punch-cutter. The working drawings are carefully ruled and drawn with the aid of instruments (french curves, compasses, rules, etc.) and on them the alignment or base line, and other lines showing depth of body, height of ascending strokes and descending strokes, set width, are indicated. These lines are the guides to which, on a greatly reduced scale, the punch-cutter will work by making micrometric measurements for all his dimensions, including also the thickness of strokes in both capital and lower-case alphabets. The skill of the punch-cutter is, of course, shown by his masterly judgment and the subtle inflexions that he makes in producing punches for the differing sizes of the same letter design. His aim is to make the set of punches uniform in a fount so that no letter, when cast in type from the ultimate matrix, shall be out of relationship with the other letters in the fount.

When beginning to make the punch of any letter, the punch-cutter first takes a piece of soft steel, approximately 2 inches long and (if small size type) in section $\frac{1}{4}$ inch square. Larger steel sections will naturally be used for larger-sized punches. On one end of this he begins to cut, by use of engraving tools and files, the shape (in raised form) of the internal portion of any letter form, e.g. the interior *white space* of the letter o or m, etc., or what is called the counter of the letter. When he is satisfied that this is correct and of the appropriate size for the fount he is cutting, the punch is tempered by heat in a furnace and quickly cooled. This (now

a counter-punch) is used to strike an impression on the end of a new piece of soft steel which will in turn become the punch proper. The impressing may be made by giving the counter-punch a direct blow into the end of the piece of soft steel or the counter-punch may be forced into the end of the soft steel punch by intense pressure in a small machine, controlled by a screw-thread which forces down a head-cap into which the counter-punch is locked. After making this

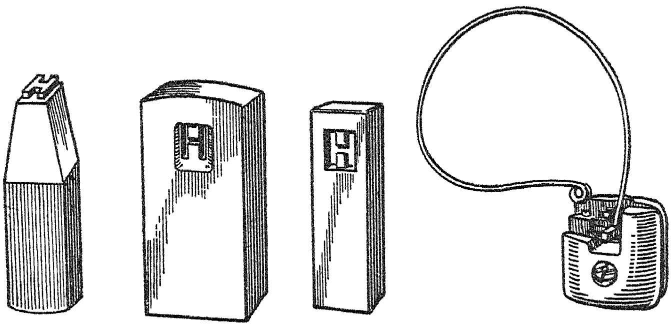


FIG. 5. PUNCH, "STRIKE," MATRIX AND HAND-CASTING MOULD.

impression the counter of the letter will now appear as an indentation in the end of the soft bar of steel. Around this indentation the punch-cutter will shape his final letter form by cutting or filing, carefully translating his working drawing to the requisite scale. Throughout the cutting of the punches "smoke proofs" on paper are made, by placing the punch in a candle or lamp flame and impressing the punch onto soft paper. Thus each stage of the punch-cutting is checked. Finally, the check of all dimensions having been made and kept, the punch is finished by tempering the steel. When this has been done the punch is used to make a "strike" into a piece of well-beaten copper or bronze, in a similar manner to that made by the counter-punch. The forcing of the hardened punch into the copper causes a slight bulging and burring which has to be filed true, and the matrix perfected by allotting accurate alignment position marks and gauge marks for positioning it in the mould of the casting

machine. This operation is called justifying. The punch, it will be noted, must be a letter in reverse; the matrix is a positive, and the type cast from it is in reverse and will print the correct way round on paper. Fig. 5 shows the punch, "strike," matrix and hand-casting mould.

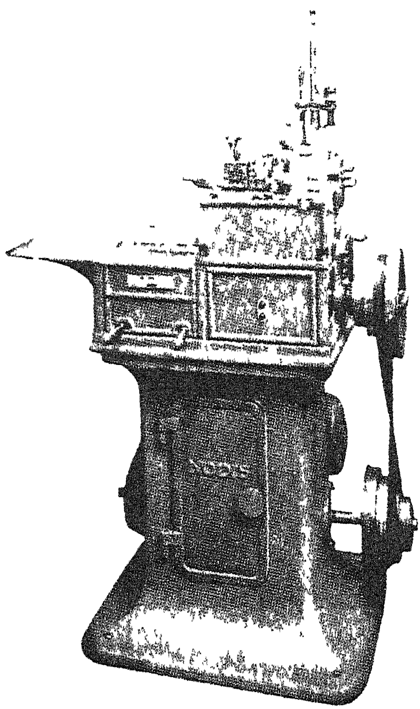


FIG. 6. A CONTEMPORARY TYPE-CASTING MACHINE.

TYPE-CASTING AND FINISHING. The actual casting of types by means of a hand mould, although still used in some instances for large-size types such as 144 point newspaper headlines or similar rare sizes, has been displaced by several machines of which an example is the Wicks rotary type-casting machine, which casts 35,000 to 65,000 types an hour, according to size of body.

The illustration, Fig. 6, shows the Nodis Rapid Caster, which enables all sizes of type from 5 to 72 point to be cast. Two moulds only are fitted, which, by adjustment, permit the full range of type sizes. The machine is very compact, and is usually provided with a "Funditor" electric heater, although a specially designed gas-burner, controlled by a governor, may be used. In addition to the casting of sorts at speed, a lead, rule and border attachment enables these materials to be cast in lengths to suit specific requirements. While specially made matrices are provided for use on the machine, it is also possible to cast sorts from Intertype, Linotype, Monotype and certain other matrices. It is also possible to cast quotations and spaces to 72 x 72 point size. The machine is often installed by printing firms because of its versatility.

The Wicks rotary type-casting machine has been much favoured in England, owing to its high output. An important innovation on this machine is the number of moulds, which, mounted in a wheel, are constantly revolved. The moulds are of predetermined set width, so that it is necessary to furnish the machine with the requisite proportion of moulds of each set-width of the characters to a fount, to allow the correct proportion of each letter to a fount to be cast.

For casting special sorts, however, it is usual for single-type casting machines to be used, as it is not always convenient to fit sufficient moulds of the required set to the rotary type-caster. The output on these machines is, of course, considerably less. Most typefounders have developed their own machines, incorporating technical improvements from time to time.

The types, when cast are, if necessary, finished by hand, according to the special requirements of any particular character, as, for instance, kerned letters, italics, etc. In order to distinguish founts, nicks are often grooved on the front of the type body, in addition to those originally formed by means of pieces of wire in the mould.

The "tang" is a wedge-shaped piece of metal (formed by the

aperture to the mould) attached to the foot of the type, and has to be broken off. Formerly it was broken off by hand and the types hand-assembled in a special stick in order to plane the groove at the base. This removed the burr and formed the feet. In most casting machines the removal of the tang and formation of the groove is automatically performed to-day.

After the types are cast they are dressed or finished and, where necessary, hand-filed (as with kerned letters or italics). They are then packed in fount assortments for sale to the printers.

Not all types are original designs; sometimes old types are copied, either from a printed impression or from other types. Where this is done, the preparation of the working drawings of the design of each character is obtained by projection to give the enlarged scale, and from tracings, accurately finished working drawings are made.

THE TYPE ALLOY. The metal used in typefounding is an alloy of lead, antimony and tin, and in the case of alloys for very small types a small percentage of copper is sometimes added. The virtues of the type-metal alloy are many and, indeed, have ensured the alloy remaining practically unchanged since the original invention. Various proportions of the constituent metals are used, according to the size of the type to be cast; the smaller the type the harder should be the resulting alloy, in order to withstand the pressure of printing and to give the type long life. Some typical alloys are:

Type	*Lead per cent.*	*Antimony per cent.*	*Tin per cent.*	*Copper per cent.*
6 point .	46	32	20	Up to 2
12 point .	56	28	16	—
24 point .	66	25	9	—
60 point .	78	21	1	—

A brief summary of the qualities governing the use of the constituent metals of the type-metal alloy is appended:

Lead, the base of the alloy, is used mainly for its relatively

low freezing point* (621° F.), for its ductility (easy flow), and because it is non-hygroscopic, i.e. it is non-rusting and not easily affected by atmosphere.

Tin, which has an even lower freezing point than lead (450° F.) is used in the alloy primarily because it makes the alloy more ductile and because it confers a toughness upon the resulting alloy—thereby counteracting the tendency to brittleness which antimony causes. It also acts excellently as an aid to fusion between lead and antimony, thus ensuring a well-distributed and entirely homogeneous alloy.

Antimony is one of the rarest of metals in that it has the unusual property of expansion upon cooling and of contraction upon heating. Its use in the alloy, therefore, ensures, a full-size casting in the mould and a filling of the matrix, and accuracy of form in the finer portions of the type-face. Although it has a rather high freezing point (1166° F.) its amalgam with lead and tin gives working temperatures to the printing metal alloys (whether founder's, Monotype, Linotype, etc.) which are convenient in use and which vary between 540° F. and 720° F. Its hardness is also an additional asset in the alloy, as its use helps to give the long life to the printing surface.

Copper confers extra toughness on the alloy when it is used to cast small-size types. Its disadvantage is that it does not fuse well with other metals in the alloy. It has a high freezing point (1985° F.), and for this reason is used in only very small percentages within the alloy.

The contemporary method of preparing punches and matrices for newly designed founts, where not hand-cut, is similar to that described in the next chapter.

* NOTE: The metallurgical term "freezing point" is more advisedly used than the more generally used "melting point". An alloy often has no fixed melting point, but the temperature at which solidification begins is definitely ascertainable and is termed the "first freezing point".

CHAPTER 4

MATRIX-MAKING FOR MECHANICAL COMPOSING SYSTEMS

MATRIX-MAKING as a repetitive process was an essential to the nineteenth century. Without the invention in 1885 of Linn Boyd Benton's pantographic machine, for the purpose of cutting identical punches from a master letter design, the whole development and introduction of mechanical composing systems would not have been so quickly practicable. The Linotype of Ottmar Mergenthaler and the Monotype of Talbot Lanston became commercial possibilities from 1886–7 onwards and owe their inception primarily to the pioneer work of Benton. His invention made possible the production of any number of identical matrices, so that (as with the Linotype) several matrices of the same character might be supplied for each fount of a given design and size, and, as with all mechanical composing systems, so that identical founts of type might be available for the use of printers anywhere. It would, obviously, have been useless to produce only one fount of type which was peculiar to the machine with which it was supplied, for the printing world demands that the same letter design shall be available to all at will; indeed, without the invention, contemporary standards of typography would have been unattainable.

It is interesting to note that the first type designs to be introduced on mechanical composition systems were the two most widely used designs in the trade at that time: Old Style and Modern. This may have been done to convince printers that these new machines could and would give them exactly the same kind of text page as in hand-setting. Apart from display faces, there existed only book type (Old Style) and Parliamentary, or newspaper type (Modern); consequently responsible firms interested in launching mechanical composing machines cut the more widely used type designs

in the early years. By the beginning of this century many other type faces which were popular in the trade were available on composing machines. The contemporary movement, however, of designing new faces for these machines did not begin until the long-sighted policy of the then Lanston Monotype Company of 1912–13. The cutting of the Imprint type (originally in 14 point size) for the journal of that name, published in 1913, resulted from the inspired collaboration of Edward Johnston (the calligrapher and renowned authority on lettering), Gerard Meynell, John H. Mason (the eminent typographer) and the Monotype Corporation. This changed the attitude of master printers to mechanical composition for book-work. The Linotype company commissioned new designs and both they and the Monotype company began to revive some of the classic type founts in a series of modern recuttings. In this work the Monotype Corporation have the distinguished advice and scholarly direction of Stanley Morison, whose contribution in this and other fields of contemporary typography has brought about radical changes during the present century.

In the following paragraphs the student will find a summary of the methods of punch-cutting and matrix-making as performed by the Benton and Pierpont machines. The Benton or an improvement of it (the Benton-Waldo) is generally in use, with adaptations developed privately by Intertype and Ludlow and Typograph composing companies, the Linotype using Mark Barr's improved machine (as patented in 1900). The Pierpont machine is the amended system developed under F. H. Pierpont's direction at the Monotype Works at Redhill. Although the chapter on typefounding dealt with hand-punch cutting and matrix-making, it should be understood that, to-day, the Benton or similar systems are also greatly used by the typefounder for the production of punches and matrices for new type founts.

If the type face to be cut is an entirely new design, original sketches are prepared in a convenient size for each character of the fount by the designer. The size generally adopted for

originals is a capital height of $1\frac{1}{2}$ or 2 inches. If, however, the type fount to be cut is a reproduction from an existing printed work, or even sorts of the type design itself, each letter is projected to about 10 inches in height on a screen and traced direct for the working drawing. Similarly, the original designs for each letter of a fount are projected or pantographically enlarged (according to system) to the size of the required working drawings, and tracings taken. The large-scale image is traced on fine cartridge or drawing paper, and is then perfected by the use of drawing instruments and french curves to obtain a perfect master drawing. On this drawing the various dimensional lines are shown for height for the body of the letter, allowance for bevel and clearance, beard and set, alignment line and height of lower-case, capital, and ascending strokes to lower-case letters. The dimensional references are usually indicated, together with series number, or name, and point body size. This finished drawing is the reference for all succeeding stages until the finished matrix is made.

Following the preparation of the finished drawing, the next stage is the production of a master pattern. In the Benton and Barr systems this is produced by tracing the working drawing on a specially designed pantograph machine, which reduces by tracing to a size of approximately 3-inch height-of-capital and produces a pattern-plate replica of the letter design. The brass pattern is obtained by soldering together two plates of brass of appropriate size, and, by means of a cutting tool, the top plate only is cut to the form of the character as pantographically traced from the larger working drawing. This leaves a relief letter (the thickness of the top plate) soldered upon a base plate, which, to prevent movement, is also riveted in position. Each character of the fount is dealt with in a similar manner.

The Pierpont (Monotype) system uses a different method for the production of the pattern. Instead of cutting this in brass, a specially prepared sheet of wax is cut, by pantographic tracing from the working drawing. This wax form on

a plate glass base is used for an electro-deposition of copper, and the shell so formed is backed with type metal as in the method used in producing electrotypes. When finished, the electrotype pattern is used in the same way as the pattern in brass (described above) for the production of punches.

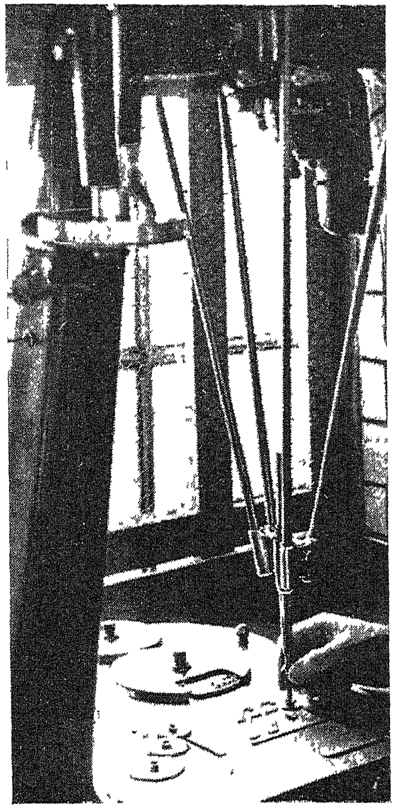


FIG. 7. "PIERPONT" PUNCH-CUTTING MACHINE IN USE AT MONOTYPE WORKS, REDHILL. (Note letter pattern.)

The punch-cutting machine differs slightly in the Benton, Barr or Pierpont systems, but in principle they are similar. The pattern is used as the master around which the image of the character is traced by a pointer. Setting the machine to a predetermined type size at the head of the machine, by means of pantographic control a punch is cut corresponding in shape to that followed around the design of the pattern. In practice, the punch blank is brought nearer and nearer to the rapidly revolving cutting tool, which has to be specially ground in order to cut away gradually the unwanted steel. This is accomplished by the use of "followers", i.e. small wheels or discs having a pin-point hole at the centre. These are used in sequence on the end of the tracer point to follow

round the design of the character of the pattern. A smaller "follower" than the previous one is used, successively, to trace around the character, starting with the largest and finishing, ultimately, with the point of the pointer control itself. When these stages, which may be eighteen to twenty in number, have been performed the final cutting of the punch has been made. It is important to note that as each successive stage of the tracing takes place, the cutting tool revolving at the head of the machine successively rises the minutest amount, thus forming the necessary sloping walls (or bevels) from the face. This ensures that the punch will withdraw easily after each matrix is struck, and that the cast type will have deep bevels from the face to the shoulder of the type.

The pattern may often be used for the production of punches for two or three sizes of matrices of a given series. The procedure originally practised was to cut all sizes from one pattern but, later, it was found that it was generally better to make different patterns for each fount (from different working drawings), in order that both book or text sizes were as satisfactory as the larger display sizes in a series. The subtlety of difference required between the one scale of sizes and the other is, indeed, difficult to attain without the difference being apparent to the critical eye. In certain founts and series the change may be distinctly observed between two sizes of type, e.g. Perpetua Roman 18 point and 24 point. In these instances the difference between the two sets of patterns is too great to avoid a marked contrast in weight of the two consecutive sizes of type. An example of pantographic cutting, where *each size* of the type has its own patterns, is in the versions of true recut Caslon Old Face by Linotype and Monotype companies. This was done to ensure a true-to-prototype series of this classic type design.

The punches, having been completed on the punch-cutting machine, are tempered by heat in high temperature furnaces and cooled in an oil bath. They are then ready for striking or

stamping specially prepared blanks, which will, when finished, become matrices. The stamping is made into bronze or copper blanks to a predetermined depth under powerful hydraulic presses. The burr or displacement of metal which tends to occur is minimized because the matrix blank is rigidly held within a steel framework.

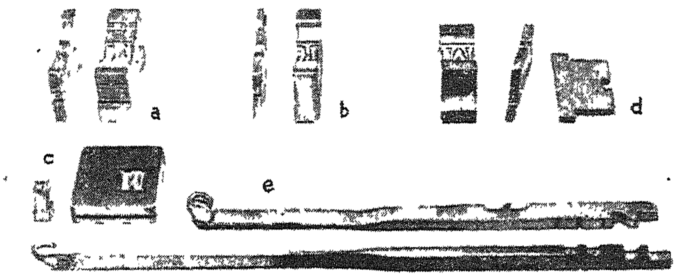


FIG. 8. MECHANICAL COMPOSITION MATRICES.

(*a*) Linotype, Duplex and Display; (*b*) Intertype, Duplex Composition and Display; (*c*) Monotype, Composition and Display; (*d*) Ludlow, Roman and special Italic Matrices (all Matrices the same overall depth either Composition or Display); (*e*) Typograph Duplex Composition, front and side views (Display similar but without Duplex characters).

When the blank has been stamped, the necessary finishing of the matrices is performed, and the matrix rigidly tested. The specific nicks or holes are cut, according to the type of matrix being made, in order that true alignment and position of the character on the type or slug body is secured. The original punch may be used to make matrices until it becomes damaged or broken, and then it is, of course, necessary to make a new one by repeating the punch-cutting and adjusting operations, working from the original pattern. As an insurance against breakage or damage of a punch the companies concerned take special care to safeguard the patterns from which punches are cut. These are, naturally,

marked with series numbers and other reference data so that the necessary information is always available, and in order that reference may be made to the original working drawing if required.

For Linotype or Intertype matrices special machines are used to make the V-shaped opening and teeth combinations at the top of each matrix, and also the size and fount-distinguishing guide slits (or nicks) at the foot of each matrix. The combinating of the teeth to effect distribution into the magazines, when on the slug-casting machine, is done by filing away certain teeth in various combinations on the different characters.

In display sizes Monotype matrices are chromium plated to ensure longer life.

CHAPTER 5

THE POINT SYSTEM

A STANDARDIZED system of measurement for printing types and spacing materials did not exist in the printing industry until the year 1886 when the American Point System was generally adopted by all the associated foundries of the American Typefounders Company. This system, later known as the *British-American Point System*, was introduced into England in the year 1900, but it was not generally adopted until approximately five years later. Even to-day the old British Bodies System, which the Point System displaced, and where each founder had his own standards and type body sizes were known by name (Pica, Long Primer, Brevier, etc.), has not been entirely abandoned. There are still some firms which have early Linotype and Monotype installations using British Body moulds, but these are reserved to those offices where much bookwork is kept standing and where revisions are required from time to time.

Several earlier attempts to introduce a point system had been made, the earliest being that of P. S. Fournier, the French founder, in 1737. Later, another famous French founder, F. A. Didot, improved upon Fournier's system, and (as Fournier before him) abolished the names for type bodies, using instead a number. Didot's system is now in general use on the Continent and is related to the metric system of measurement. Fournier's method dated from the period before the introduction of the metric system.

The Point System is not, unfortunately, related either to the inch or metric system of measurement, but is based on the arbitrary standard of the commonest "pica" in use in America at the time of the introduction of the system. The pica equals 0·166044 inch, and this is further subdivided into points, there being twelve points to a pica. The point therefore equals 0·013837 inch. All type sizes and thicknesses

of leads, clumps, and reglets, are made to *points*, but all general dimensions, such as the measure (or width) or depth of a page, lengths of borders, leads, etc., are made in *picas*. All spacing material (leads, clumps, reglet, quotations, wood and metal furniture) is made to point system dimensions.

In practice the Point System has made easy the composition of the most intricate matter and provides every facility for fitting together type, borders, rules and spacing materials, whether hand- or machine-set.

Reference should be made to certain developments of the Point System of which the student compositor should be aware, although their use in practice is extremely limited: *Point Common Line*, *Point Title Line*, *Point Script Line*, and *Point Set* types. The first three of these refer to an attempted standardization of the beard of normal Romans (with lower-case), Titling, and Script types, respectively. The beards of the various sizes of types conform to an exact number of points, according to the size of body. The intention is to aid the alignment of a series of type faces, or sizes, with another, or the alignment of rule, etc., with type. Without unduly stressing the impracticability of the system — primarily because the compositor cannot always know whether a type is cast to standard *Point Line*—the following reference list may be helpful in anticipating the beard size of types, should they be cast to *Point Common Line*:

5, 6 pt.	has	1 pt.	beard	36 pt.	has	7 pt.	beard
7, 8, 9, 10	,,	2	,,	42	,,	8	,,
11, 12, 14, 16	,,	3	,,	48	,,	10	,,
18, 20	,,	4	,,	54	,,	11	,,
24	,,	5	,,	60	,,	12	,,
30	,,	6	,,	72	,,	14	,,

The standards adopted for the beard of Point Title Line (for Titlings) and Point Script Line (for Scripts) are not given here since they are rarely used, and if required the information is available in type-founders' catalogues.

It should be emphasized, however, that the great majority of contemporary type designs are *not* cast to the Point Lining System. The mechanical requirements implicit in designing

a type so that it is possible to cast the type on the above system places severe limitations upon the design, i.e. it implies a restricted dimension to the descending strokes of the lower-case letters to a fount which would impose undue limitations on good letter design.

The introduction of *Point Set* in the early days of the change-over to the point system was an attempt by founders to regulate the set widths of individual type characters and to give them an exact point dimension. Its only value to the compositor was the knowledge that certain letters were of the same width, and this was of slight help in correcting type matter. The system was not successful, since in practice it did not allow an accurate cast-off of the total points in a line, which had been claimed for it. Although no longer important insofar as founder's type is concerned, the system has been put to excellent use in the Unit-Set principle of the Monotype system (*see Mechanical Typesetting*).

ADAPTABILITY OF THE POINT SYSTEM. Apart from the obvious advantages of the Point System to the work of the compositor in setting and make-up, there are some advantages which are not sufficiently realized.

The piecing of leads or clumps to odd measures may often be made without special cutting of material by the combination of type spaces with leads. One example will remind composing students of the accuracy of the materials with which they work: If an odd length of 2 point lead is required of, say, 22½ picas, the use of a 6 point *thick* (3 to the em) *space* would enable the 22 picas lead to be used together with the space (which actually measures 6 x 2 points.)

Similarly, the use of *quads* (quadrats) of small body size types may accurately be used as *spaces* of display size types: e.g. 30 point thick space (30 x 10 points) is equal to a 3-em quad of 10 point.

The Point System, of course, greatly aids the accuracy with which all type calculations may be made. The various problems met with are to be found in *Compositors' Work*.

THE SIZES OF TYPES. The generally accepted scale or progression of type sizes has become standardized in the various type-foundries, and these sizes have been adopted by all mechanical composition systems. Fig. 9 shows the progressive sizes in one fount (Caslon Old Face) covering a range from 6 to 72 point body sizes.

Fi 72	Flor 42	Remarks 18
		Thoughtful 14
	Remi 36	Typography 12
Fo 60		Typographical 11
	Norm 30	Typographical 10
	Remark 24	Typographically 9
		Typographic layout 8
For 48	Normally 22	Typography is an exceed 6

FIG. 9. SCALE OF TYPE SIZES IN A SERIES (CASLON OLD FACE ROMAN).

In addition to those shown, some type founts are made in 5, 7, 13 and 16 point. Very rarely, however, are such sizes as 28 point or 32 point, etc. made. The largest size generally cast in metal is 72 point, though on some occasions a larger size of 84 point is available (particularly in Continental founts on the English market).

In the case of Wood-letter or Poster Type the size designations are made in picas, but the term "line" is used, although meaning picas, e.g. 12-line wood-letter indicates that the body, to accommodate capital height, is 12 picas. (Note: There is generally no beard in poster type, the descending

strokes of the lower-case letters are made to overhang the body.) Wood-letter is made in sizes from 4-line to 75-line.

THE CHARACTERS IN A FOUNT OF TYPE. There are three distinct kinds of type founts: Book, Jobbing and Titling. A Book fount would include three alphabets (Capitals, Small Capitals and Lower-case), Points of Punctuation, Figures, Accented Letters, Reference Marks and certain Mathematical and Commercial Signs, and a limited assortment of common Fractions. In a Jobbing fount, two alphabets only are supplied (Capitals and Lower-case) together with Figures, £ sign and Punctuation Points. In a Titling fount, Capitals only are supplied, together with Points of Punctuation and (sometimes, although not always) Figures and £ sign.

Unless specially ordered with a complete Book fount Mathematical and Commercial Signs and Fractions are omitted. The characters in a complete Book fount are shown on the page overleaf.

ORDERING TYPE. Concern is often expressed in deciding the correct weight of founts to order from the type-founder. Reference to any type-founder's catalogue will show that a weight is given against a standard fount of the size indicated. With book founts this weight is for a pair of cases, and in jobbing founts for a double-case (capitals and lower-case in one case). In titling founts (of smaller sizes) the weight is for a half-case (half of a capital case); the larger sizes in all founts should, of course, for convenience, be laid into open trays with slats. Generally, the printer will be advised to order the standard fount weight as indicated by the type-founder, but with the larger orders the printer will decide his own weights, and it is useful to remember that a pair of cases will hold approximately 50 lb. and an improved double-case approximately 20 lb. With rare founts, such as italics or scripts, founts of special weight are indicated by the founder; but in every instance the type-founder will supply half-founts if required. A useful and convenient guide *for jobbing founts* (though here, again, the usefulness of the letter design and the size of the

CHARACTERS TO A FOUNT OF TYPE

Capitals . . .	ABCDEFGHIJKLMNOPQRSTUVWXYZ
Small capitals . .	ABCDEFGHIJKLMNOPQRSTUVWXYZ
Lower-case . .	abcdefghijklmnopqrstuvwxyz
Diphthongs . .	Æ Œ Æ Œ æ œ
Tied letters (ligatures)	fl ff fi ffl ffi
Accented letters .	á é í ó ú, acute à è ì ò ù, grave â ê î ô û, circumflex ä ë ï ö ü, diæresis ç, cedilla ñ, tilde
Figures . . .	1 2 3 4 5 6 7 8 9 0
Reference marks .	* asterisk † dagger ‡ double dagger § section ‖ parallel ¶ paragraph
Punctuation marks .	, comma ; semi-colon : colon . full point ? question mark ! exclamation mark ' apostrophe - hyphen — em rule (metal rule) – en rule
Miscellaneous signs .	) parenthesis] bracket & short "and" (ampersand) £ pound ct st QU Qu (optional tied letters)
Spaces . . .	hair, thin, middle, thick
Quads. . . .	en, em 2, 3, 4, 5 and 6 em quadrats
Fractions . .	$\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$ $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{1}{6}$
Braces . . .	to em units of the body
Leaders . . .	.. (also single, triple, or 4-dot) on em body
Mathematical signs .	= × ÷ + − ′ ″ °
Commercial signs .	% / @ $ ℔

composing department should be considered) is to order, in sizes up to 18 point, the same number of pounds as the body size. As the size increases above this, the weight will decrease, e.g., a 30-lb. fount of 48 point is a good, usable jobbing fount. A further helpful guide (generally given in the catalogue by the type-founder) is to indicate the fount proportion by showing the number of capital A's and lower-case a's to the fount of the weight indicated. Printers may then form an idea of the proportion of other letters in the fount by referring to the Fount-Scales shown in type-founders' catalogues.

WOOD-LETTER OR POSTER TYPE FOUNTS. It is usual for the larger sizes of type above 72 point (rarely 84 point) to be made in wood instead of type-metal. There are two reasons for this: to save undue weight in the formes in which large types are used; and to produce large sizes of letters more conveniently and more economically than could be done in metal, where the larger the size the greater the difficulty of casting a perfect face to the letter. Specially selected and matured end-grain rock maple wood is therefore used and these letters are cut on special routing machines working pantographically from a master pattern, similarly, although without the same extreme precision, described in Chapter 4.

Wood-letter founts are not sold by weight, but at the "dozen letter" rate, and printers, when ordering founts, give the number of dozen sorts (letters or characters) required. It is usual to order, say: thirteen dozen capitals, lower-case, and punctuation points, and two dozen figures, for a small fount. This will mean that the typefounder will apportion the correct relative quantity of each letter and punctuation points, totalling 13 dozen sorts, and add, additionally, two dozen assorted figures (giving more of figure 1 and including the £ sign). The *minimum* fount would be eleven dozen letter and points plus two dozen figures. A better scale for a normal jobbing office would be sixteen dozen letter and points plus three dozen figures. Reference should be made to the type-founder's catalogue for the apportionment of letters to each fount (according to the scale required).

CHAPTER 6

TYPE DESIGNS

CONTEMPORARY typography has been influenced greatly by the development of a more rational or sensible outlook to the consideration of its basic material, type. No longer does the compositor walk around the composing room to set a line to suit his job, and if the required type happens to be short in the case, use another of entirely different design. Type, too, is regarded as a form of expression, which by its *appropriate use* may convey the *intention* of the copy more happily. Further, the need for *related* Italics to use with Romans, and *related* Bold Faces has been developed largely during the present century. The complexity of modern printing, and the occasions the printer is required to meet, for either advertiser or publisher, have demanded an increased range of founts in almost every printing office. No printer can afford to ignore the trend in design nor the repertory of types demanded by modern advertising or book publishing. Fortunately, the day is long past when *any* type is deemed suitable for *any* job.

This new outlook created a marked increase in the number of new type designs placed upon the printing world markets during the fifteen or twenty years preceding 1939. In addition to new designs from the type-founders, many new type designs have been issued by the manufacturers of mechanical composition systems. Apart from the introduction of faces similar to those of the founders, with whom there is a very natural competition, these companies have also contributed greatly to the repertory of printing type designs available to the discriminating printer. Certain designs are peculiar to one mechanical composing system, but often they are also provided as an alternative, and the student will call to mind eminently successful type designs such as: Baskerville (available on. all kinds of mechanical composition as well as in

founder's type); Perpetua (available in founder's type and on the Monotype); Times New Roman (Linotype and Monotype) Aldine Bembo (Monotype only); Granjon (Linotype and Shanks'); Plantin (on Intertype, Linotype and Monotype), and so on.

A convenient division may be made in type faces, according with their purpose: types intended for text matter (book types), and those intended for the use in display or jobbing printing (jobbing types). In each category there are, of course, hundreds of designs of which a fuller classification and analysis is made in *Typographic Design*. There has been one important change of approach by the founder during the present century and this is in relation to the multiplicity of differing designs *adapted* from an original design. This probably began at the end of the nineteenth century by the introduction of De Vinne, in America, a type no longer in general use to-day. This letter design was adapted in various forms: wide (or expanded), condensed (or narrow), shaded, bold, etc., diversions from the original but which maintain a general likeness in face characteristics. The "classic" example of the extent to which this development of a type "family" (as these related series are called) may be exploited is best exemplified in the Cheltenham Old Style family. Different designs bearing a resemblance in general characteristics were cut, and, ultimately, no less than 10 versions (or, more correctly, adaptations) were in use. It is probably this cutting of a "family" of designs which resulted in the overwhelming popularity of the Cheltenham family during the first 20 years of this century. The original design, which although no longer popular in contemporary typography, is a good legible roman, but it was its adaptation to Wide, Bold, Italic, Bold Italic, Bold Compressed Italic, Bold Wide, Bold Extended or Distended, Bold Compressed, Outline, Shaded, *and* Two-colour versions that reached a climax in the disastrous lengths to which the founder was prepared to go in order to produce a wider market for his wares. In contemporary printing, a reversion to this practice is seen in, for instance,

the many Sans-serif designs and slab-serif (Egyptian) designs available to-day in many related designs. While there is a danger if this practice becomes general, because of the poor letter forms and even ugly innovations that tend to be introduced, it is, perhaps, fair to mention that in some contemporary founts of related designs, consummate skill has been

FIG. 10. THE "GILL SANS-SERIF" FAMILY (RELATED DESIGNS OF SEVERAL SERIES).

Some of the Series of the Gill Sans Family: Heading in Gill Sans Titling 231, (1) Gill Sans 262, (2) Gill Sans Light 362, (3) Gill Sans Shadow Line 290, (4) Gill Sans Condensed 485, (5) Gill Sans Ultra Bold 442, (6) Gill Sans Cameo 233, (7) Gill Sans Shadow Titling 304, (8) Gill Sans Cameo Ruled 299, (9) Gill Sans Bold 275, (10) Gill Sans Bold Condensed 343, (11) Gill Sans Extra Bold 321, (12) Gill Sans Bold Condensed Titling 373, (13) Gill Sans Bold Extra Condensed 468, (14) Gill Sans Shadow 406.

shown on the part of the designer; noteworthy examples are Cable, Gill Sans, Beton, Corvinus. Fig. 10, illustrating the variants of Gill Sans, will demonstrate to the student a good instance of the typographic value of related designs in a family.

ABCDEFGHIJKLMNOPQRSTUVWXYZÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZÆŒ
abcdefghijklmnopqrstuvwxyzæœ
£1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZÆŒ
abcdefghijklmnopqrstuvwxyzæœ
ABCDEFGHIJKLMNOPQRSTUVWXYZÆŒ
abcdefghijklmnopqrstuvwxyzæœ
£1234567890

FIG. 11. RELATED ROMAN, ITALIC AND BOLD FACE FOUNTS IN IMPRINT (12 POINT BODY SIZE).

It should, however, be noted that the term "series" in relation to type founts implies all the body *sizes* made in a particular letter design, e.g. Caslon Old Face 6 to 72 point, and so on.

Another valuable trend in the production of type designs

Aldine Bembo	Perpetua	Old Style 5
Xhx	Xhx	Xhx

FIG. 12. SHOWING VARIATIONS OF X-HEIGHT, ALL 36 POINT BODY.

for mechanical composition is the issue of related *Italics* and *Bold Faces* to work with a roman text letter. This has been consistently extended not only to existing romans but to newly designed romans. In some instances an existing italic has been associated with an existing roman (as with Centaur roman with Arrighi italic on the Monotype). Prior to this

century, not all roman types had a related italic, and fewer still had a bold version of the roman. With the development of all forms of mechanical composition the tendency has been to introduce founts in which there is roman, italic and bold-face. This has, alike, benefited both publisher and advertiser and the present-day typographer makes full use of these related founts. Fig. 11 shows a typical example.

An important aspect of type design is the relative size of the face on the body. This varies considerably and is governed by the relationship of the x-height in both capital and lower-case alphabets, with correspondingly differing lengths of descending and ascending strokes. It will be realized that a type with a large lower-case x-height will exhibit correspondingly less interlinear spacing *when set solid*. Conversely, when a type has a relatively small lower-case the interlinear spacing appears to be greater. A comparison of three types, Fig. 12, illustrates this.

I have always been a great admirer of the calligraphy of the Middle Ages, and of the earlier printing which took its place. As to the fifteenth-century books, I had noticed that they were always beautiful by

I have always been a great admirer of the calligraphy of the Middle Ages, and of the earlier printing which took its place. As to the fifteenth-century books, I had noticed that they

FIG. 13. COMPARISON OF TYPE-SIZE AND WEIGHT.
Left, 12 point Aldine Bembo; right, 12 point Plantin.

In types similar to Ionic 5 (Linotype) the largest possible face size is given to the lower-case alphabet, with consequent shortening of descending strokes. On the other hand types like Perpetua or Garamond have extremely long descending strokes and a small size lower-case alphabet, as is shown in the above comparison with Old Style No. 5, all of which are 36 point types. The difference this makes when a text size of type is used *and is set solid* is shown in Fig. 13.

The value of the above differences of face size are dealt with more fully in *Typographic Design* to which the student is referred.

Before leaving the subject of type design, reference should perhaps be made to the parts of letters, and although no general glossary of accepted terms exists, the details given in Fig. 14 will enable the student to refer intelligently to any letter design.

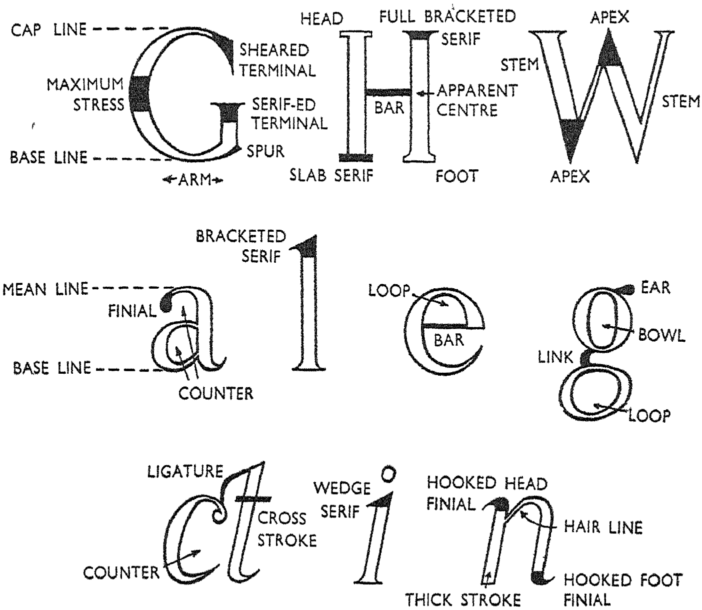


FIG. 14. THE PARTS OF LETTERS.

The consideration of type designs would be incomplete without reference to figures, the design of which presents a typographic difficulty when planning some items of printing. There are two kinds of figures: those which are in harmony with the lower-case alphabet, and those which are the same height as capitals. One kind is called Old Style or non-ranging figures (irrespective of the name of the type fount,

i.e. Caslon Old Face has old style figures); the other kind is called Modern or modernized figures which were introduced much later (in the nineteenth century). Fig. 15 shows both kinds of figures.

Figures are usually cast on an *en quad* body width, the purpose being to facilitate the accurate ranging of figures in columnar matter.

While discussing figures it is, of course, necessary to consider fractions and the various commercial and mathematical

A1234567890 "Modern" Figures (Capital height).

a 1234567890 "Old Style" Figures (Lower-case height).

FIG. 15. "MODERN" AND "OLD STYLE" FIGURES COMPARED.

signs provided both by typefounders and on the various mechanical composition systems. The more usual and generally used fractions are cast on an en quad body ($\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, etc.). When, however, the rarer fractions are required they are normally cast on an em quad body ($\frac{1}{16}$, $\frac{3}{32}$, $\frac{5}{24}$). Alternative forms of fraction (on em quad body) are obtainable, and in these the numerator is separated from the denominator by a diagonal stroke. A further and useful possibility, is the employment of split fractions, where the fraction is pieced by the use of small numerator and denominator units. The latter usually has the horizontal line above the figure, the numerator consists of the figure only. Split fractions are, of course, made in various sizes to make normal type body sizes; e.g. 5 point split fractions for 10 point, and so on.

The commercial signs such as %, @, ⅌, etc., are often, *although not always*, on an em quad body. It is essential to check these items when in use if difficulties caused by imperfect justification are to be avoided. The *solidus* (shilling stroke) may be obtained on various body widths, and this should be ascertained when using them in order to facilitate the ranging of columns. It is often used with ordinary figures to make up fractions in ill-equipped composing rooms.

Mathematical signs are numerous and although generally cast on a standard body of en or em quad widths, in order to facilitate composition of mathematical matter, care must be taken when using them to verify this. Reference to the type-founders' or mechanical composition companies' catalogues will show the various sorts obtainable. Special items, such as superior or inferior figures or letters (^{1}, $_2$, ^{a}, $_b$) are generally on 3- or 4-to-the-em bodies.

There remains to be considered the founts of type having no lower-case, but which comprise capitals, figures, and points only. These are called *titling* founts. They are often, though not always, equivalent in *face* size to an existing size of type, having a lower-case, in the same series. When made in 60 and 72 point sizes they, normally, give extra and larger face sizes to the range of the ordinary founts. This is because titlings have no beard (there being no lower-case). Lines may, when required, be set to appear much closer together than would otherwise be possible. They also serve admirably as initials to paragraphs since there is no beard and they may be fitted snugly.

CHAPTER 7

DECORATIVE AND SPACING MATERIALS

DECORATION in bookwork or in jobbing work is obtained, apart from the use of illustration, by the employment of elements of typographic material in the form of brass or other rules, type borders, and initials.

Rules are made in a range of point body thicknesses and with many kinds of face, and are generally supplied in brass to withstand wear in printing. It is the practice to purchase brass rule in labour-saving founts, generally in half-pica progression to 25 ems, then rising by picas to 40 ems, and continuing by 2-ems to 50 or 60 ems. Alternatively, in larger offices, it may be the practice to buy lengths of brass rule, generally 2 or 3 ft. long, for cutting as required. The disadvantage of the latter method is (*a*) the wastage that unavoidably occurs; (*b*) the consequent inaccuracy, due to the use of imperfect cutters; and (*c*) the waste of time because point-cut and dead-accurate material in border cases or racks is not readily available.

Nowadays, however, many printers use rules cast in type-metal on Monotype, Linotype, Intertype and Ludlow-Elrod machines. These may be cast to any length where Monotypes and Ludlow-Elrod machines are used, but with both Linotype and Intertype machines the maximum length is the mould size on the machine, generally a maximum of 30 picas, thus necessitating piecing the rule in use. The finer-face rules are generally on a minimum body of $1\frac{1}{2}$ point in brass (or 2 point if cast in type-metal), and the face is either centrally or to one side of the body. The term "single bevel" indicates a face on one side of the body, and the term "centre-bevel" (actually a misnomer) implies that the face is placed central on the body, with equal bevels on each side.

Examples of rule thicknesses are shown in Fig. 16 and an indication of the character of the faces.

Type borders are multitudinous and are often inaptly used in contemporary typography. They are often poor in design and have a limited usefulness. Some of the finest border units date from their first use as ornaments in bookbinding, and many contemporary designs are recuttings of those of

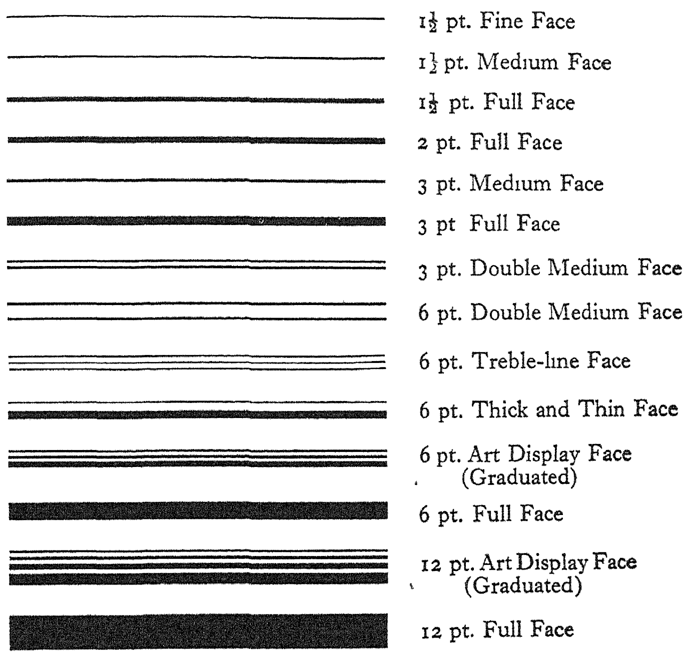


FIG. 16. EXAMPLES OF BRASS RULE THICKNESSES AND FACES.

founders of the sixteenth, seventeenth and eighteenth centuries. There are a rather limited number of good present-day designs, and these are often border units that have been specifically designed for particular presses.

The type-founders' borders are usually single units which may or may not be combined with other related units. In certain instances good decorative and suitable borders may be made by their use. Far too often, however, the borders consist of ugly single motifs which no competent typographer

would use, unless he were compelled. Solid spots, squares, diamonds, etc., are rarely successful, neither are the semi-realistic representations of objects such as books, sundials,

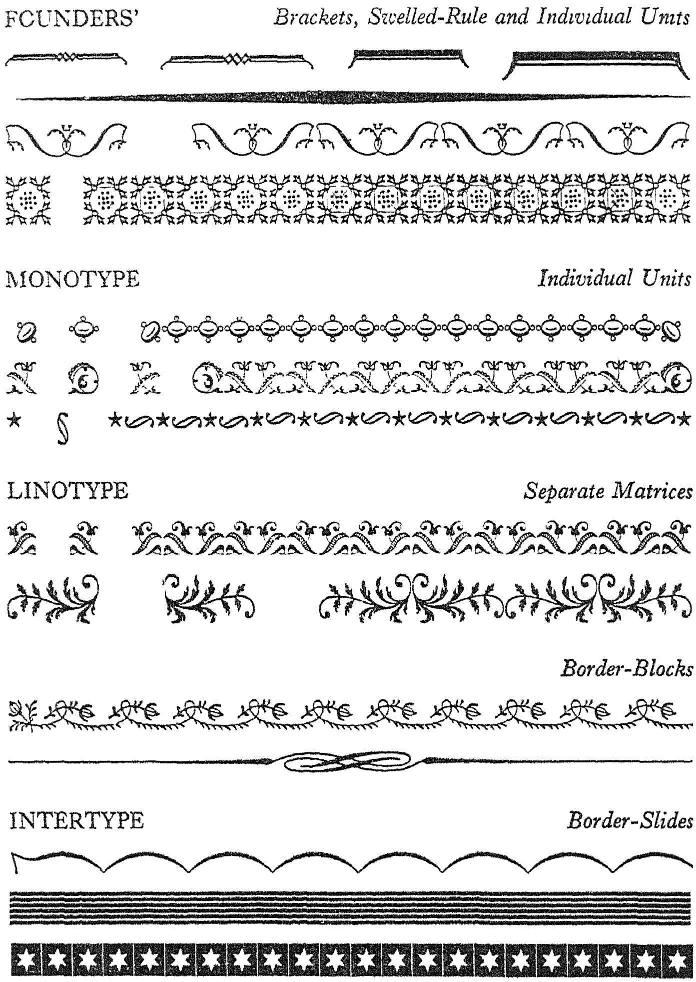


FIG. 17. VARIOUS EXAMPLES OF PRINTERS' DECORATIVE BORDERS, DASHES AND BRACKETS; INDIVIDUAL UNITS AND SLUG UNITS.

candles, human figures, animals, etc., which are often found in printing offices. Great care is, therefore, essential first in the choice and secondly in the use of borders.

Decorative brackets, and scrolls, which imitate calligraphic flourishes, have been introduced by founders during the past ten to fifteen years, and at one time were frequently used in conjunction with definite type designs with which they were often successfully harmonized.

The borders on mechanical composing systems are, of course, similar to founders' borders and cast on the unit principle, but in the slug systems border-slides or border-blocks are provided in which the mould length of border may be cast from one special matrix, thus allowing the production of decorative dashes, brackets, swelled rules, etc., as well as lines of assembled units.

Another form of typographic decoration is provided by the use of initials at the beginning of paragraphs (generally for chapter-openings in bookwork or, where applicable, in jobbing work). In the nineteenth century the initials used became more and more inferior in style, because of the prevalent use of founders' stock initials which were generally too ornate, poor in design, and badly drawn. On the other hand appropriate initials are often found in the work of the more notable printers of the sixteenth and seventeenth centuries. The present century has witnessed a return to the use of simple and plain letters, often without any decoration whatever, and many examples may be seen where the use of type is eminently appropriate. If type initials are used, care should be exercised in their choice. They should be of correct weight or colour for the text page with which they are used, simple in form, and of good proportion. In this connection titling founts will be found serviceable, particularly where the type design is related to the text type.

There are many ways of fitting initials (*see* Fig. 18); the first word (or words) is generally set in capitals or small capitals of the text type. All initials should fit comfortably, without unnecessary space either under or at the side.

PLEASING appearance is, in all these instances, prevented owing to the ugly white space under the initial, and by the indented lines.

(*a*)

EACH occasion will be treated on its merits. And in this instance, the first word following the initial is completed in Capitals.

(*b*)

THERE are a few letters, such as T, V, W, Y, which may well be thrown out into the margin slightly, as in this instance. The text should range with the stem or point.

(*c*)

ANOTHER method of arranging an initial, in the case of letters like A, O, L, is to mortice the initial in order to allow of the close-up insertion of word.

(*d*)

ONCE more the fitting of a decorative initial to a paragraph of text is here shown. Adjacent lines are sometimes indented.

(*e*)

THE appearance of a job depends largely on white spacing. Correct spacing not only aids the general appearance of the type.

(*f*)

FIG. 18. EXAMPLES OF THE FITTING OF INITIALS TO PARAGRAPHS.

In the first example (*a*) a normal capital letter has been used; the beard leaves an ugly "white" below the initial; in (*b*) a titling capital has been used in a suitable size *so that it aligns correctly at both head and foot* (with the head of the first line of type and with the base of the third line); in (*c*) an alternative method of fitting the initial is shown; and (*d*) shows a variant used for certain letters which have to be mortised at the corner to allow the word to follow the initial closely. Example (*e*) shows a contemporary decorative initial which

should be compared with (f) a nineteenth-century "horror"!

The essential note in the use of all typographic decoration is *appropriateness*, and the student would do well to study good standards of printing as exemplified in the productions of certain noteworthy printers and publishers. It is generally far safer to allow type alone to make the design than to spoil its simplicity by the use of inappropriate borders.

SPACING MATERIALS

Spacing material is of several kinds, each having its particular purpose. It is produced in accordance with the point system to accurate dimensions, and it is preferable to buy it always in labour-saving or point-cut lengths. Many firms, however, prefer to buy the leads, reglets, clumps, and wood furniture in 2-foot or 3-foot lengths for cutting to size.

Leads are made in 1, 1½, 2 and 3 point thicknesses (hair, thin, middle and thick, respectively) and are made of a low-grade type alloy. They are used for spacing lines of type, paragraphs, under headings, etc. They are about the height of quadrats.

Reglets are made of wood usually of 6-point or 12-point thickness, although other type body sizes are obtainable. They are used in large formes to reduce the weight of metal between lines and spacing generally. In book work it is usual for pages to be tied up with page-cord with a reglet top and bottom. Reglets are also used in furnishing the forme when imposing pages.

Clumps are similar to reglets but, like leads, are cast in low-grade type alloy. They are normally 6-point and 12-point thick. Their use is for spacing large areas, spacing between paragraphs, or in arranging margins inside borders.

Wood furniture is used for furnishing formes when imposing or for locking up matter on a galley. It is made in widths of 2, 3, 4, 5, 6, 8 and 10 ems (12 point).

It is also used with *Sidesticks* (which taper) and wooden quoins. Specially seasoned wood is used. It is well oiled to

prevent undue shrinkage or swelling which may be due to change of temperature or humidity in the composing room. The upper-side of the furniture in widths over 2 ems has a scored line in the centre throughout its length; this is essential for 4-em furniture (which is almost square in section) so that the true width dimension can be instantly seen.

Metal furniture, or french furniture as it is termed, is cast in type-metal to point dimensions and consists of pieces in sizes from 8 to approximately 60 picas long, and in widths of 2, 3, 4, 6, 8 and 10 ems (12 point). To avoid undue weight, the furniture is generally cast with hollow central cavities of a braced, girdering structure. It should be treated with care as it is easily damaged if dropped and may break.

Metal furniture is also made of steel, and more recently, several lighter metals such as cadmium alloys have been used. In one kind the furniture is in the form of a rectangular tube, hollow throughout its length, and pressed to shape and size. This variety is not entirely satisfactory when used with its end against small size type.

Quotations are also cast in type alloy to point dimensions, and are in effect large-size quadrats. They are used with metal furniture for areas of white space, as well as for spacing lines of larger sizes of type. They are cast to the following sizes in 12 point ems:

$$2\times2,\ 2\times3,\ 2\times4,\ 3\times3,\ 3\times4,\ 4\times4,\ 4\times6,\ 6\times6.$$

They are often referred to as "quotes".

Skeleton Furniture is made in steel and consists of pieces 2 ems or 3 ems wide having at each end a pica notching to allow one piece to interlock with another. Four of these pieces, when interlocked, form a rectangle and it is, therefore, possible by their use to make up large areas of white space economically in a forme. Skeleton furniture is usually supplied in cabinets or sets of assorted lengths and, although costly, is a most valuable and time-saving adjunct to composing room spacing equipment. The use of skeleton furniture saves weight and also undue use of valuable metal furniture.

"Lockit" corners are specially cast in type metal for use in combination with 3 em or 4 em pieces of metal furniture. As reference to Fig, 19 will show, they allow *smaller* rectangles of white space to be formed in the manner of skeleton furniture. They should *not* be used for larger areas of space where skeleton furniture is more practicable.

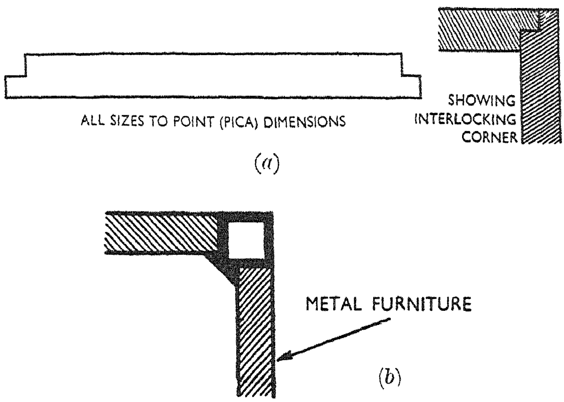


FIG. 19. ECONOMY SPACING MATERIALS.
(*a*) Skeleton furniture; also showing mortised corner. (*b*) "Lockit" corner cast in type-metal and used with metal furniture.

Plate-mounting quadrats. The use of illustration blocks (line half-tone, etc.) in composing, especially where they are small and numerous as in catalogue work, is greatly facilitated by the use of a mass of "high" quads. These are cast under type-height (for either original or duplicate plates), so that the plates may be mounted with tacks or by means of some patent adhesive. In use, the compositor places the quads in position wherever his blocks are to appear, sets or arranges his type around them, and finally mounts the plates in position on the quads.

CHAPTER 8

TOOLS AND COMPOSING DEPARTMENT SUNDRIES

THE tools required and used by the compositor personally are few. Some of these he should acquire for his personal use, but the remainder should be provided by the printing office itself. In every instance the tools of the compositor may be regarded as precision instruments that will well repay care in handling and use—for his work as a craftsman depends on accuracy, and accurate work cannot be performed with indifferent tools.

THE TOOLS OF THE COMPOSITOR. The compositor will require at least two *composing sticks*, and convenient sizes are 8 inches and 12 inches long. Later, it may be advisable to procure a smaller stick, say 6 inches long, but this will depend on the type of work on which he is engaged. The composing stick must be accurate and true throughout its length, and it is desirable for the method of securing the slide to be positive so that it will not move when lines are being spaced or justified. A thumb-lever is often preferred to a thumb-screw for this reason. The end of the stick must be exactly at right-angles to the flange, along which the slide is secured at any given measure. It is also essential for the inner face of the slide to be at right-angles to the flange, so that each succeeding line of type that is composed and justified will be of identical length. Composing sticks are made in many metals, including steel, rustless steel, german silver, and cadmium and aluminium alloys. Provided they are strong and accurate, the lighter the weight, the better.

There are special or patented composing sticks, generally made to give an automatic true-point setting to any measure, usually in 6 point progressions, given by means of a notched rack setting on the underside of the stick. Great care should

be exercised in use: they may be accurate when new, but the slightest damage will impair their reliability and consequently their usefulness.

A set of brass *setting-rules* ranging from 4 to 40 picas is also essential and many compositors prefer to make their own. It is, however, generally more satisfactory to buy a set, as each rule is stamped with its size, complete in a wooden box from the type-founder. The setting-rule is used in the stick with the beak or neb towards the right to facilitate the setting of the type. After a line has been justified the rule is placed above it, preparatory to setting the next line. The

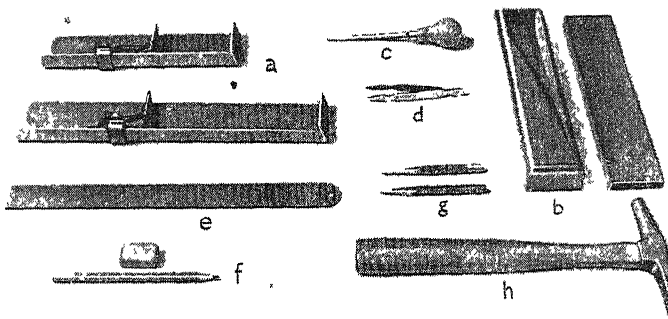


FIG. 20. THE ESSENTIAL TOOLS OF THE COMPOSITOR.

(*a*) Sticks; (*b*) set of setting-rules; (*c*) bodkin; (*d*) tweezers; (*e*) type gauge in steel; (*f*) pencil and rubber; (*g*) tack punch and centre punch; (*h*) hammer.

beak of the setting-rule is the small projecting lug at one end; this is useful for lifting the setting-rule from the stick when transferring the rule above the lines as well as for securing the end of page-cords when tying-up pages.

The *bodkin* and pair of *tweezers* are useful small tools which, *when used properly*, are an asset to the compositor in his work. The bodkin is essential for lifting short lines when correcting on the imposing surface; similarly the changing of letters or spaces is aided if tweezers are used with care; it is not always possible in very short measures to lift the line being corrected

from the remainder, or to pick out with the fingers the appropriate letters or spaces.

If the composing room is adequately equipped, the only other tools likely to be required by the compositor for his personal convenience are a *type gauge* (preferably of steel, accurately engraved), a small hammer, a tack punch and centre punch (for pinning down plates) and, of course, a pencil and rubber (for preparing case-room layout roughs of jobs he may have to set direct from copy and making out time dockets).

OTHER TOOLS USED BY THE COMPOSITOR. The various sundry tools provided by the management of the printing office will vary slightly according to the type of work done in the composing room.

Chief among these are (*a*) the *planer* which is made of hard wood, either of small size (for jobbing) or large size (for book-work), and is used to plane down the type before locking-up a forme, to ensure that the type is level and standing on its feet; (*b*) the *mallet*, also of wood, similar to a carpenter's mallet. It is made in large and small sizes, and is used for locking-up wooden quoins in combination with the shooter; (*c*) the *shooter* which may be of steel, wood or vulcanite, is approximately 8 inches long. Vulcanite is to be preferred because it is light, does not split like wood, or damage type, or pock-mark the stone, or split quoins as does a metal shooter. It should be noted that when planing-down a forme, the handle and not the head of the mallet should be brought down on to the planer. Further, the planer should *always be placed face upwards* on the stone or imposing surface, so that it does not become battered or pit-holed or pick up dirt or pieces of metal which would damage the face of type or blocks when it is next used. Similarly when planing a forme with delicate type (scripts or italics having kerns) or half-tone blocks, the planer should be covered with one or two thicknesses of paper, and used gently, prior to tightening the quoins.

CHAPTER 9

COMPOSING ROOM EQUIPMENT (1)

THE composing room is the department of the printing office from which the "copy" emanates in the physical form of composed and corrected type matter, rules, borders, and blocks, securely locked into chases, preparatory to the actual printing which is performed on the printing presses in the machine department.

The composing room has usually its specialist ancillary departments of mechanical composition, either Intertype, Linotype or Monotype. If a large amount of jobbing work is undertaken there may be, in addition, a Ludlow installation either as a separate department or in the general composing room. A description of these systems is given in *Mechanical Typesetting* to which the student is referred. Note: The Typograph, an alternative (though in the British Isles somewhat rare) method of slug composition is also used.

The open wooden frames of the old-fashioned composing room are, or should be, things of the past, for no longer is it necessary to regard the department as the haven of dirt and dust. The present-day practice of installing well-made dust-proof cabinets, built of either wood or steel, upon a unit plan system has revolutionized the cinderella of the printing office. Despite this, considerable expenditure is often made on the machines of the printing and binding departments, while, in the same firm, the equipment of the composing department is primitive, inadequate, out-of-date, and an uneconomic unit of the business. The essence of the composing room is the orderliness and tidiness of all equipment and an adequate stock of all spacing material, type, rules, etc., sufficient galley, chase and storage racks, imposing surfaces, and randoms, for the storing and handling of composed matter. It should, too, have an atmosphere of serenity so that concentration upon the work in hand is possible and so that the occasions of error are minimized. Good lighting,

of the right kind, is essential and this should be the first consideration in any composing room.

Whether the cabinets and other equipment of the composing department should be in wood or steel is a question about which it is impossible to generalize. Personal preference undoubtedly plays a great part in the choice, but apart from this there are advantages in both. The vital factor of space is a consideration, and metal cabinets, fount racks, galley racks, imposing surfaces, etc., represent a general saving in overall dimensions. Against this they are cold to the touch, especially in cold weather or when the department is not adequately heated. The consideration of cost, again, is not a greatly influencing factor. It should be noted that, up to the present, even where the cabinets are of metal, the type cases are of wood with fronts painted to match the finish of the metal.

THE UNIT SYSTEM OF COMPOSING CABINETS. This system was originally introduced in America and since its introduction to England has found increasing favour by progressive printers. The essential feature of the plan is that each case rack is backed by another unit (called an "auxiliary" unit), and these adjoin a similar pair of units placed in the opposite direction, the whole being surmounted by a double-sided random top, with or without auxiliary lead cases. The plan in Fig. 21 shows the principle.

The case-racks themselves are made with extension fronts, i.e. the case runners project beyond the width (front to back) of a case. The case is thus allowed to be fully withdrawn, without risk of falling, while yet remaining in the rack, and the extended runners allow all compartments of the case to be accessible. With the greater use of jobbing founts, containing capitals and lower-case and points only, it has become general to use only one case per fount and this is generally an improved double-case. Pairs of cases (upper and lower) are, of course, still used to accommodate book founts having the additional small capitals and accented letters, etc.

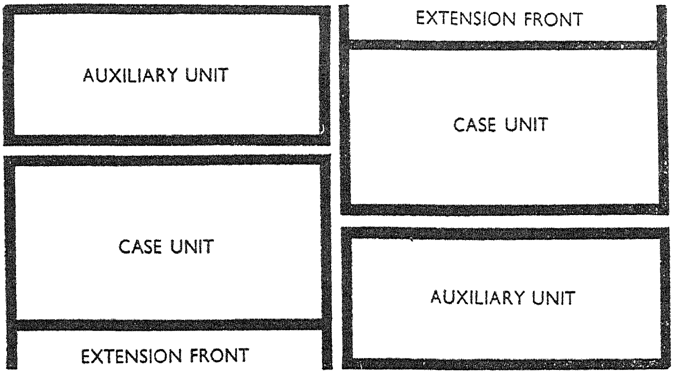


FIG. 21. PLAN SHOWING ASSEMBLY OF UNIT COMPOSING EQUIPMENT.

The "auxiliary" units, which back the case units, may be of several kinds, according to the plan required in the composing room, and may vary according to the type of work. Several stock patterns are available, but it is still always

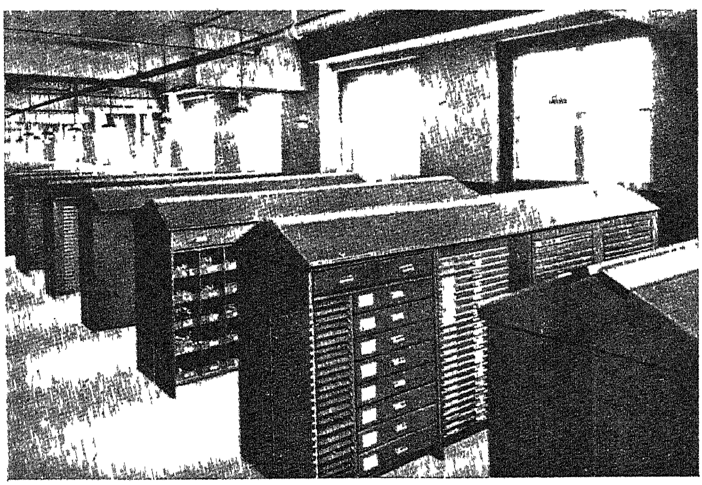
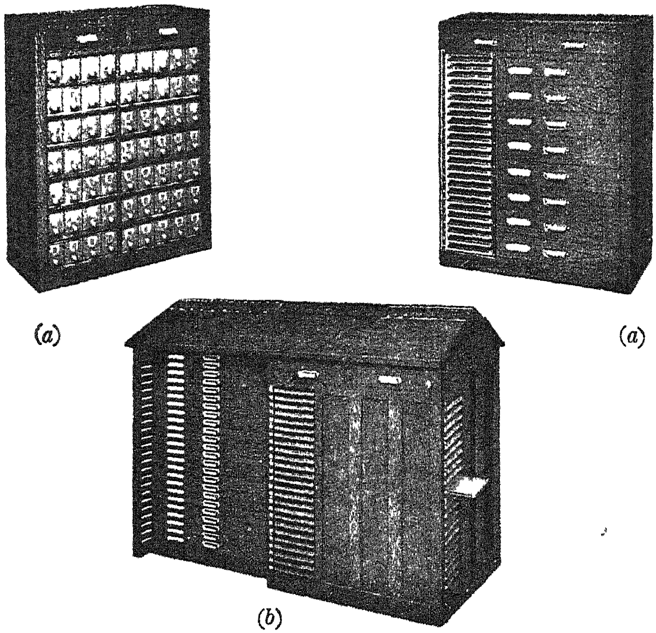


FIG. 22. A PORTION OF A WELL-PLANNED COMPOSING ROOM. UNIT EQUIPMENT IN STEEL, INDIVIDUAL RANDOMS FITTED WITH AUXILIARY LEAD RACKS.

possible, within the unit plan, to have an auxiliary or backing unit made for a special purpose. Galley units, either to accommodate tiers of quarto-size galleys, or of quarto (from the front) and columnar slip galleys (from the end); drawer units (called "clicker's" units); forme-rack units; galley-random units; furniture rack units; quad.-and-space bin



(a) (a) (b)

FIG. 23. UNIT EQUIPMENT.

(a) Two typical auxiliary units; (b) auxiliary and case units assembled and surmounted by a double random top with auxiliary lead cases.

units; block-tray units; sorts-bin units; cupboard (for storage) units; and so on, are provided, and the needs of any composing room may thus be met. Fig. 22 shows a view of a modern composing room, where each compositor has, additionally, auxiliary lead cases, placed upon the ledge of the

random, to each cabinet. This, of course, is an ideal of great time-saving value, and, although it requires perhaps a greater stock of leads in the room, has much to commend it.

Typical units are shown in Fig. 23, together with the assembled units, and the student will at once realize possibilities in planning, especially when individual drawers are provided, under the random, at the top of any auxiliary or case unit, for the personal use of each compositor.

The housing of type founts in a large composing room always presents a problem, and to give more rack room than that available in the composing cabinets, tall *vertical case racks* are made, and, often, ranged along a wall of the department. They usually hold about 45 cases and are of a height which allows the compositor to reach the top case (but not to set from it!), lift it down, and mount it on a cabinet random.

TYPE CASES. There are several kinds of type case made to English and American standards, each for a special purpose, according to the kind of fount it is intended to accommodate. The American standards are slightly larger than English ones. Cases are generally well-made trays with compartments, or notched racks allowing the use of wooden strips or slats, and are, or should be, lined with paper to prevent small types from getting fixed under the wooden divisions of a compartment.

The commonest and earliest kind of cases form "a pair", and consists of an *upper-case* and a *lower-case,* the description referring to the position of each when in use on the supporting upper-case brackets and on the random top of the modern cabinet. The plan or arrangement of the characters in the compartments varies slightly in different firms, but those shown may be regarded as a normal standard.

It will be noted that the old plan of having the capitals of an upper-case in the top four rows of boxes on the left-hand side, has been changed. By placing the small capitals in their

A	B	C	D	E	F	G	á	é	í	ó	ú	§	†
H	I	K	L	M	N	O	à	è	ì	ò	ù	‖	‡
P	Q	R	S	T	V	W	â	ê	î	ô	û	¶	*
X	Y	Z	Æ	Œ	U	J	A	B	C	D	E	F	G
1	2	3	4	5	6	7	H	I	K	L	M	N	O
8	9	0	ſ	ç	ñ	&	P	Q	R	S	T	V	W
a	e	i	o	u	Qu	k	X	Y	Z	Æ	Œ	U	J

FIG. 24. PLAN OF UPPER-CASE LAYOUT.

place, and by moving the accented letters to the top three rows on the right, the capitals become in the most accessible position, i.e. right of centre and in the lower four rows of the upper-case. (*See* Fig. 24.)

Similar changes are made in the outer small compartments of the lower-case. While the more general plan is as shown in Fig. 25, in many offices the figures are placed, in order, from the thin and middle space box, along and down the right-

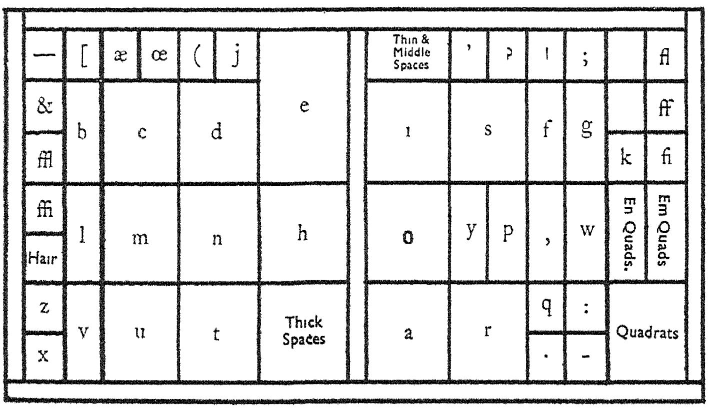


FIG. 25. PLAN OF LOWER-CASE LAYOUT.

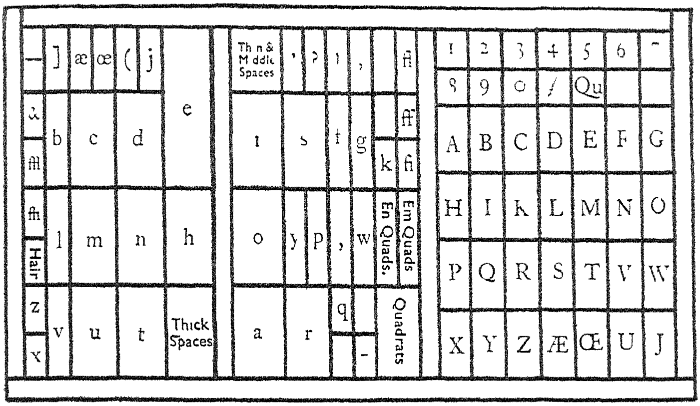


FIG. 26. PLAN OF IMPROVED DOUBLE-CASE LAYOUT.

hand edge, above the em quad box, finishing the sequence by placing figures 9 and 0 above the en quad box. The displaced points and ligatures are rearranged and take the place of the ligatures on the left-hand side, some transposing and others being placed in the figure boxes in the upper section of a double-case, or in the upper-case of a pair.

The accommodation of jobbing founts of type has resulted in a wider use of *improved double-cases* (*see* Fig. 26). These

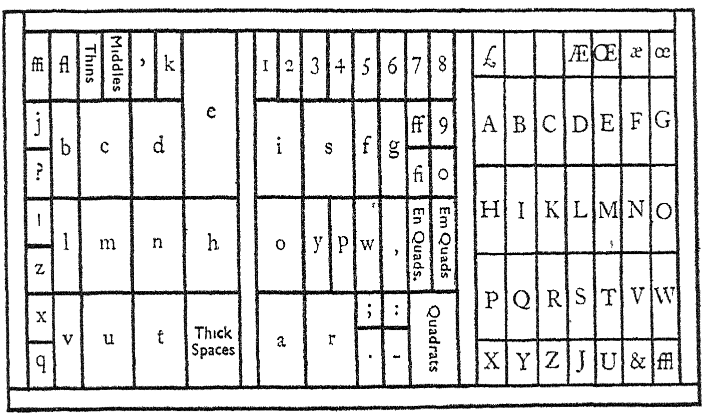


FIG. 27. PLAN OF CALIFORNIA JOB CASE LAYOUT.

cases allow the lower-case to be arranged as normally, but occupying only two-thirds of the case width; the remaining third is occupied by half of an upper-case except that, instead of there being seven rows of boxes, there are six only, thus allowing four rows of larger boxes for capitals with two rows of smaller boxes at the top of the case for figures, etc.

An earlier form, the *double-case*, had seven rows of boxes of equal size in the capitals section, but this is seldom bought to-day, although it is unfortunately in use in many firms.

The so-called *California job case* is an improved version of a double-case, and one which is widely used in America. It is being increasingly adopted in jobbing composing rooms in this country because of its greater capacity. The layout is as shown in Fig. 27.

A *half-case*, made to accommodate titling founts, is half an upper-case and contains seven rows of boxes of equal size.

Treble and *four-fount cases* have, respectively, three or four sets of boxes arranged as in a half-case. These are now rarely used, but are made for related Lining Founts, where three or four sizes of capitals on one body size are made to a common alignment.

Wood letter or *script cases* are of two kinds, used according to the size of the type. They have notched racks on both sides of an open tray into which the strips of wood, called slats, fit, thus permitting the type to be arranged in rows, separated by slats. One kind has a centre-bar and is generally used for the smaller type sizes (capitals and lower-case are separated in each half); the other has no centre bar and is used for the larger wood letter sizes. The larger sizes of metal types are often accommodated in these cases.

Rule cases are made to allow founts of point-cut brass rule to be arranged progressively, generally by 6 points up to 26 ems and then by picas to 40 or 42 ems, larger sizes being at 2 em intervals. There are, of course, the older types of small *rule cabinet*, and combination rule founts in separate

boxes with hinged lids; the latter are popular and are used for small founts of Art Display and other multiple-face rules.

Another kind of case is the *open tray*, without notched racks or slats, useful for storing blocks and oddments. Other kinds of case are made to suit special requirements.

GALLEYS. There are two types of steel galley in general use to-day. The *angle-steel* (or A.S.) galley is stronger and slightly more expensive than the *pressed steel* (P.S.) galley. The latter has the sides pressed up from the flat sheet, whereas the angle-steel galley has sides riveted to the base to form a true right-angle with it. It is, of course, preferable to have rustless steel galleys wherever possible. The sizes of

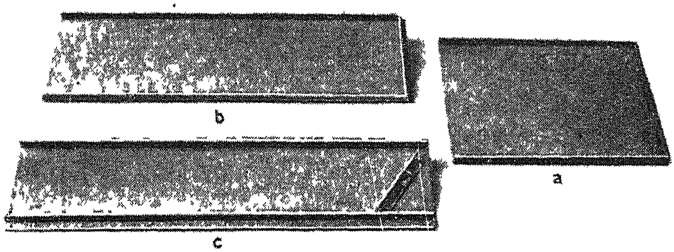


FIG. 28. RUSTLESS STEEL GALLEYS.
(*a*) Quarto (P.S.); (*b*) column, or slip (P.S.); (*c*) Monotype, loose end (A.S.).

galleys are reasonably well standardized, the normal jobbing quarto galley having an inside dimension of $8\frac{3}{4}'' \times 13''$. *Column* or *slip galleys* generally have an overall length of 24 inches and are made in varying widths from $4\frac{1}{4}$ inches to $13\frac{1}{2}$ inches or larger. An older type of galley was made of zinc and wood or of wood only, but these are not generally used to-day. There is an important point to note when handling *Monotype galleys* or galleys made for these machines. The end flange is *removable*, because when the type matter is cast on the machine the last line is cast first and, therefore,

the galley is used with the flange at the left instead of at the right. When proofing, it is usual either to transfer the matter to normal galleys, or, if using the loose-ended galley, to reverse the end to the right, and then secure the type in the normal way. The student handling Monotype for the first time may easily handle the galley of matter and, for want of instruction or caution, "pie" (or upset) the whole of the type.

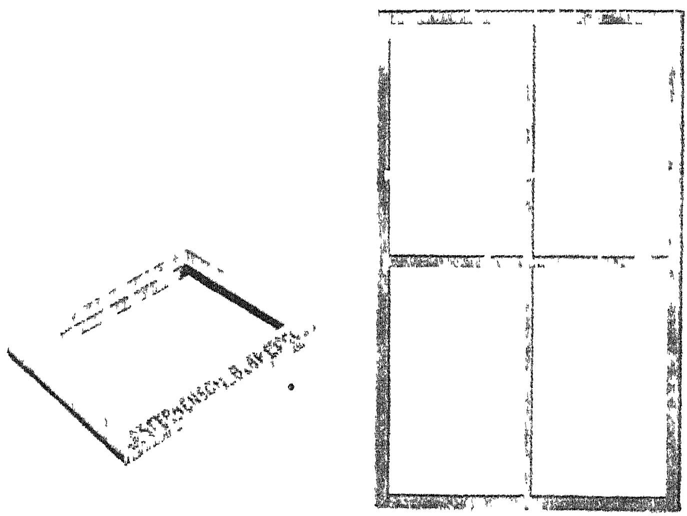


FIG. 29. JOBBING CHASE (IN CAST IRON); BOOK CHASE (IN STEEL), SHOWING DOVE-TAIL FITTINGS FOR REMOVABLE CROSSBAR.

CHASES. When a job has been proofed and corrected it is prepared for the printing machine by imposition in a chase. These are of many kinds and may be made of cast iron in smaller sizes, or wrought iron or steel, according to size and purpose.

Jobbing chases are available in all normal paper sheet sizes and sub-divisions. If of sheet or double-sheet size (actually a chase is always an inch or two larger than the broadside sheet of its name) it is called a broadside chase. Such chases

have stout rims to enable posters or large areas of type to be secured within them. The smaller sheet size sub-divisions have corresponding chases (again slightly larger than the actual size of the paper); there are, therefore, folio, quarto, octavo, and card sizes. More generally these are of cast iron, but wrought iron and steel (which are in every way preferable and more accurate) are obtainable.

When several pages have to be printed together on one sheet, of normal, double or quadruple size, *bookwork chases* are used. These have either fixed or (more generally) movable cross-bars, thus enabling a safer lock-up to be obtained by locking-up towards the centre bars in each quarter of the imposition scheme. They are usually of steel. When these chases are required to be exceptionally large, usually for quadruple size sheets, special *folding chases* are made. These are made in pairs which adjoin each other and are placed with their narrow rims side by side when on the machine, thus making the short cross-bar of the large sheet only slightly wider than a normal cross-bar. An alternative variety is obtainable where each pair fits together by means of an overlapping of the two rims, and these are eminently convenient. Each half-chase has one cross-bar, thus enabling the two quarters (of the whole sheet) to be securely locked up. Movable cross-bars are fitted to book chases to permit their use as broadsides, if required, and also to allow the imposition of 12mo and similar schemes. In the latter instance, the short cross-bar is moved to the higher pair of dovetail fittings, thus allowing three rows of pages to be imposed uprightly.

Specially shaped chases are made for particular jobs. *Heading chases* are long, narrow chases used when imposing type for account book headings, etc.; they conform to the sheet sizes of account book and other stationery papers, and are made to ordinary, sheet-and-a-third, and sheet-and-a-half dimensions as customary with papers for this special purpose.

Foundry chases are made specially for newspaper work,

and have thick, type-high rims. They generally incorporate a mechanical locking-up device to contain the great pressure which is necessary with large broadside pages.

News chases, used when printing direct from type, are similar to foundry chases in their mechanical lock-up but are without the type-high rims.

Machine chases are of various kinds and are made to fit a particular machine. They usually have lugs or flanges, where a gripping device on the machine ensures a firm and positive hold during printing.

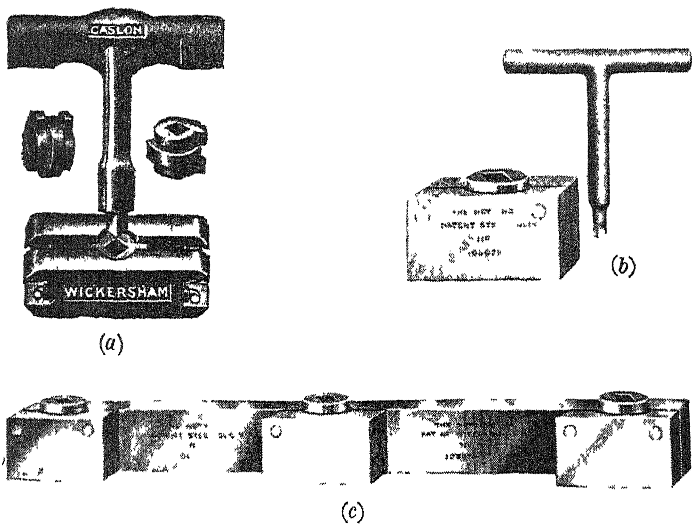


FIG. 30. MECHANICAL QUOINS.
(*a*) Wickersham patented quoin, with key; (*b*) Notting patented quoin, with key; (*c*) Notting patented lock-up bar, fitted with three quoins (also made with two quoins).

QUOINS. The simplest quoins, used preferably when locking up small formes, are *wooden quoins* (or small wedges). They are used in combination with wooden *sidesticks* (which are tapering pieces of wooden furniture against which the quoin fits) and are driven tightly by a mallet and shooter (*see*

Chapters 7 and 8). A common trouble with such quoins is the shrinkage caused by excessively hot or dry weather and the imperfect lock-up due to the differing standards of quoins and sidesticks of the various suppliers. Obviously, if a wedge is to fit properly it should have the same co-incident angles as the sidestick with which it is used, and quoins and side-sticks should always be obtained from the same source. Such inconsistences are the cause of considerable trouble in the composing room.

For larger jobs, however, or when a register forme is to be be locked-up, some form of mechanical quoin is preferable. The least satisfactory (although popular because of relative cheapness) is the *Hempel* quoin, which consists of two identical parts, wedged-shaped, which have a toothed rack on the inner, slanting edge. These are actuated by means of a special shaped key, which causes them to slide against each other and exert the required pressure. They cause, however, a certain amount of "side-drag" which results in an out-of-squareness in the lock-up. The *Wickersham* quoin is a powerful quoin, made in several sizes, which exerts tremendous pressure by the employment of a three-disc cam. The quoin is made in two halves and is held together with springs at each end. It exerts pressure by means of a key which forces the three-disc cam to its wider dimension, thus opening the quoin.

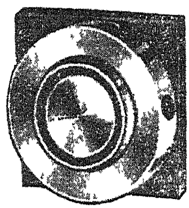


FIG. 31. PRECISION REGISTER QUOIN FOR IMPOSITION OF COLOUR BLOCKS.

If used carefully these quoins are perfectly satisfactory, but, because of their tendency to snap back to normal (due to the springs) immediately the maximum width of the cams is passed, there is a danger that quoins *opened to their maximum* in the locking-up of the forme, may work loose during printing and cause serious damage. The remedy is obvious.

Another excellent quoin for general use is the *Notting*. This is rather slower in action than the Wickersham because the pressure is obtained by a screw thread which forces a

movable wedge upwards between the two halves of the quoin, thus forcing them apart. Its action is positive and tremendous direct pressure is obtainable; and there is no danger of the quoin working loose. When using both Wickersham and Notting quoins it is generally advisable to insert a short length of reglet on each side of the quoin. This tends to prevent wooden furniture from bruising or marking by the direct pressure of the quoin.

Owing to their powerful pressure, great care should be observed when using all mechanical quoins to avoid the breaking of chases.

A special type of quoin is made for imposing register work such as colour blocks, and both *Cox's* or *Precision* quoins are admirable because they take up little width and may, therefore, be included in margins between the blocks; also, by reason of their fine micrometer thread setting, they enable the smallest movement to be made to obtain register.

All mechanical quoins should be carefully preserved and occasionally oiled to prevent rust; their usefulness will not then be impaired. On no account should formes containing mechanical quoins be brought into contact with water.

CHAPTER 10

COMPOSING ROOM EQUIPMENT (2)

LEAD, RULE AND SLUG CUTTERS AND MITRING MACHINES. There are many patterns of lead and rule cutters and mitring machines, some relatively inexpensive and generally inaccurate, and others which are precision instruments. In the cheaper varieties no attempt is made to provide the various pica or 6 point settings found on the better models. With cutters, the slide is adjustable along a base plate, on which the lead or rule rests, and is tightened by means of a thumb-screw to the required position for the appropriate length. The handle of hand models is depressed, causing the knife edge to cut across the width of rule or lead with an action

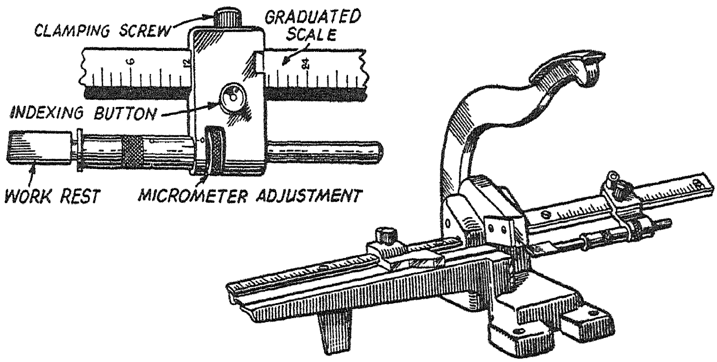


FIG. 32. "UNIVERSAL" LEAD AND RULE CUTTER FITTED WITH MICROMETER ADJUSTMENT TO PERMIT $\frac{1}{4}$-POINT SETTINGS.

similar to that of a pair of shears. Generally the base plate has two ledges, the nearer one is used for cutting leads and the back one for rules.

In cutters of better pattern there is generally a micrometer adjustment to allow leads and rules to be cut to $\frac{1}{4}$ point units if required. The "Universal" Lead and Rule Cutter illustrated in Fig. 32 shows the normal notched setting slide (to 6 point units) and the micrometer setting (to right of

blade) which permits odd point-cut measures to be obtained.

In addition to lead and rule cutters, it is necessary, in composing departments using slug-set mechanical composing systems, to provide slug cutters. These are similar to the cutters previously described but they are stronger, and should have accurate 6 point and 12 point settings. They are indispensable and enable slugs cast to a wider measure (owing to a limitation of mould-liners on the machine) to be trimmed accurately to the required measure. Slugs should *never* be cut on a lead and rule cutter.

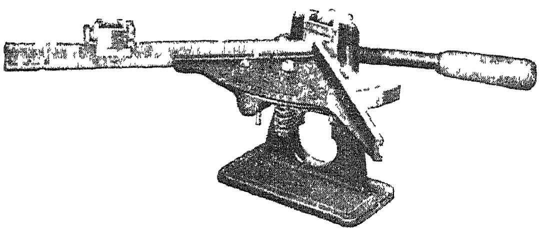


FIG. 33. "ROUSE" HAND-MITRING MACHINE FITTED WITH $\frac{1}{4}$-POINT CUTTING MICROMETER ADJUSTMENT.

Mitring machines differ widely in quality and performance. The best is an economy if the essential accuracy of the point system is to be maintained in the composing room. Earlier patterns have the cutting blade fitted in the slit of a heavy cast wheel, which, when rotated by hand, causes the rule to be shaved at the required angle. The angle of cut is determined by the adjustment of a segment on the table of the machine (generally by fixed notches, giving say 90°, 60°, 45° and 30° angles). The rule is held against this segment, on which there may also be a slide, adjustable to pica dimensions or other units (although this is not fitted as an accurate notched setting on cheap machines). A higher grade of rule mitrer is the "Rouse", Fig. 33. This machine has not only a notched sliedr-setting to 6 point units but also a micrometer adjustment which allows $\frac{1}{4}$-point settings to be obtained. Several fixed settings are available for other angles of cutting. In this machine the cutting blade is fixed in a slide-piece

which slides in a grooved channel, and is operated by hand by raising and lowering the handle. Rules may be cut to any angle and to any predetermined length with extreme precision.

In larger firms, several types of power mitrers and rule cutters are installed, and these are, normally, based upon the principle of the rotary saw. Instead of a circular saw fixed under a bed-plate, a cutter wheel (with appropriately shaped teeth for giving the required angle) is fitted. By raising or lowering the bed, the cutter teeth may be set to cut through the exact thickness of any rule. The piece of rule is thus mitred through from the underside and two edges are at once obtained so: 

If a change of angle is required a new cutter wheel is quickly fitted. By holding the piece of rule in a sliding clamp, and adjusting the slider gauge to give the correct rule length, it is quickly and smoothly passed over the cutter which revolves at high speed.

SAWS AND PLANERS. The modern composing room if it is to meet the needs of contemporary production needs a precision circular saw and a planer. Several patterns that enable the mounts and blocks to be cut and planed squarely and to be sized or shaped both with accuracy and ease are available. The type of equipment installed naturally depends on the individual needs of the office, but small-size items, capable of trimming plates and slugs, similar to those used by electro- and stereo-typers have won favour in the composing room. Their use is in every way preferable to the inaccurate and

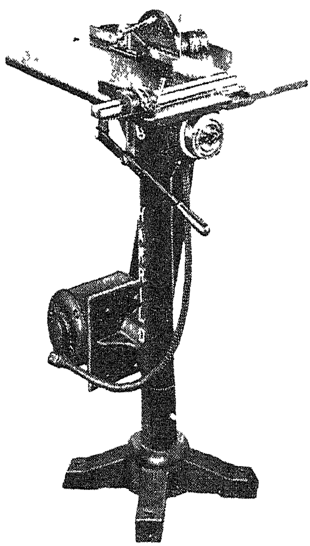


FIG. 34. BLOCK AND MOUNT TRIMMER, POWER OPERATED.

troublesome hand-cutting with a small tenon saw which is often practised. In certain types of saw, the cutters are interchangeable with specially cut rule mitrers.

FORME AND CHASE RACKS. The accommodation of imposed jobs (formes) is a constant problem in the composing room and the larger the office the greater will be the need for adequate forme accommodation. The normal pattern rack has spaced runners to accommodate various sizes of formes side by side, but with a clearance space between them. Similarly spaced grooves, between fillets, are formed at the rear of the rack, at right-angles to the base, so that the formes are held upright when pushed to the back of the rack. This type of rack has many disadvantages: small formes between larger formes are not easily accessible; type and blocks are battered in withdrawing or inserting formes; dirt and dust collects in the racks and tends to prevent the formes being pushed well back to be held by the vertical grooves, with consequent damage to the printing surface by formes leaning one against another. An improvement is possible where formes of standard size (and size of chase) are kept in separate racks, for then the spaced runners at the foot are duplicated at the top of each row of chases or formes to hold each chase positively vertical. This type of rack is in every way preferable to the former type.

A recent improvement, however, made to the author's instructions, provides a patent "hanger fitting" on the underside of each shelf in a rack (above each row of formes); this holds the top edge of the chase, which is standing in its base groove, and thus retains it in an upright position. The advantage of this type of rack is that formes of varying size, such as card to quarto, or octavo to folio, or folio to a sheet size, and so on, may be accommodated in the various rows of a forme rack. Fig. 35 will make this clear.

The old L-shaped open racks, which are left to lie around the floor collecting dirt, and perform imperfectly the purpose

of a forme rack, should have no place in a modern composing room.

FURNITURE AND SPACING MATERIALS RACKS OR CABINETS. The provision of racks of all kinds, for leads, rules, wood furniture, metal furniture, quotations, etc., has

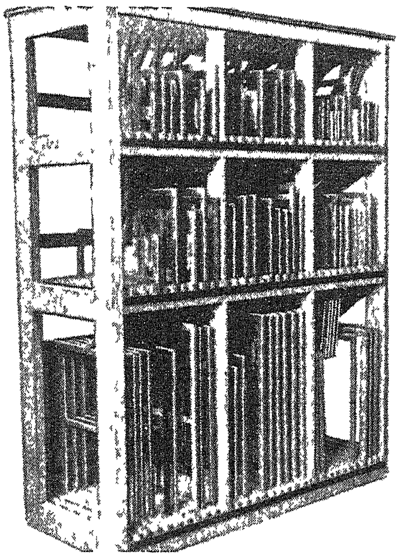


FIG. 35. FORME RACK FITTED PATENT HANGERS ALLOWING VARYING SIZED FORMES TO BE ACCOMMODATED WITH SAFETY.

long been needed in the composing room. Too often, old, inadequate and duplicated racks are scattered around the composing room, in any convenient or rather inconvenient position with complete disregard of the plan of the room or any consideration of the appropriateness of position for the rack concerned. The current tendency in a well-planned room is either to decentralize entirely or else to attempt to centralize all the main spacing material racks or rule or border racks to the most practical advantage.

If the unit plan system of composing cabinets is adopted, opportunity is afforded to "decentralize" and to arrange each "alley" between rows of cabinets so that it is as self-supporting as possible. To this end auxiliary lead cases are provided (to fit on the ledge of the cabinet random) so that both point-cut lead and rules may be accommodated in each group of cabinets for the convenience of the compositors working there Similarly by the provision of auxiliary sorts or quad-and-space bin units, furniture-rack units, etc , the minimum of time is wasted and all compositors in the room have a handy supply of all normally essential materials for their work.

In offices of moderate size, because of the cost of duplicating materials, it is, perhaps, not possible to plan the room on the ideal of the fully-provided unit system, nevertheless, a careful *centralizing* of all normally required items, to ensure the minimum walking distance for all compositors, is to be commended. If unit plan cabinets are installed it is wise to arrange them so that the relative auxiliary units for sorts bins, chase racks, galley racks, etc , are more centrally placed, and the less-used units accommodated at each end of the room A useful unit of equipment is a central *spacing material cabinet*, with lead racks surmounting racks for both wood furniture and metal furniture, and clumps and reglet; this may be specially made to suit individual requirements (which is preferable) or obtained as a standard item. Fig. 36 shows one of these improved lead and furniture cabinets.

The old practice of having small "pigeon hole" racks for each and every fount of rule, or border, or any other special item, is now becoming obsolete. Rules are more generally kept in special rule cases, when point cut, or, if of special combination face, generally in boxes with hinged lids.

IMPOSING SURFACES Present-day imposing surfaces are a great improvement upon the old pattern, when a steel surface was mounted upon a rough open wooden frame, fitted with one or two drawers under.

The use of the space underneath the steel top has been wisely used in various models, and may, in addition to a drawer, include accommodation for galleys (either column or quarto), letter-boards (for the storage of type pages) with dust-proof removable fronts, forme racks, or sorts bins, etc

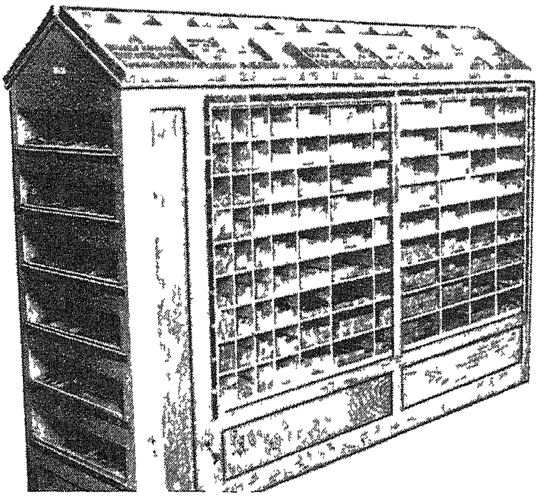


FIG 36 LEAD RACK AND FURNITURE CABINET.

The sizes of imposing surfaces generally conform to standard paper sizes or multiples thereof—or are of a convenient size to take the chases of that size in any given instance, e.g. quad crown has a surface area of approximately 48 by 36 inches.

PROOFING PRESSES. The earlier type of hand-press has been supplanted in many composing departments by small cylinder proofing presses, and by the larger book-proofing presses (often power operated). Some of these presses are described in *Proof and Platen Presses*, to which the student is referred.

LINING-UP TABLES AND PRE-MAKE-READY. Lining-up Tables or Register Tables are generally provided in the letterpress machine department, but it is sometimes necessary for the compositor to use these instruments or to have his formes checked by their use. The first-named has, usually, a steel base mounted approximately to table-height on a wooden frame, and upon which (accurately at right angles and exactly parallel with long and short sides of a sheet of paper) are two rules. These are movable along both long and short edges of the sheet which is laid to grippers coinciding with the lay-edge of the sheet as proofed on the cylinder press. The purpose of the ruling-up table is to allow a sheet from any forme to be ruled up and thus show inaccuracies in position or out-of-squareness of any part of the forme. By its use, the compositor is able to see at once the faults in his forme and to make any necessary adjustments before the machine department receives it. A great deal of make-ready time on the machine is thus avoided.

A register table is similar to the ruling-up table but it has a clear glass top and a series of lamps underneath in a box-reflector. This enables the register or the backing-up of a sheet to be inspected as the lights enable the underside printing to show through.

The rules are sometimes actuated by wires and pulleys on a compensating system but in a more recent model specially bedded steel rods have large steel T-squares sliding along them, each at right-angles to the other. These are built as precision instruments and need to be used with great care if their efficiency is not to be impaired.

They are widely used during the make-ready of formes in the letterpress machine department.

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